

# Rosa Dec. Ex. 1

# Business Alignment Meeting

Driving Value with Da Vinci® Surgery

INTUITIVE.

**Purpose of slide:**

Establish that the purpose of this presentation and discussion is to evaluate and demonstrate the measurable value of da Vinci surgery.

**Statements:**

Our objective today is to walk you through the core elements of how Intuitive Surgical has delivered “measurable value” to over 1,500 U.S. hospitals.

I believe there is a misunderstanding about our company out in the market. I think there is a perception that da Vinci surgery adds cost to the health care system with no proven clinical benefits and it couldn't be further from the truth.

I'd like discuss the total value of da Vinci surgery. It provides reproducible outcomes and a surgical experience that can be cost effective and enable strategic advantages.

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<p>From a hospital perspective, clinical benefits may result in the potential cost savings discussed here; however, these clinical benefits and costs may vary per hospital, and be higher or lower than mentioned during this presentation, and have not been published or peer-reviewed. The implementation of a da Vinci surgery program is practice and hospital specific. Results may vary. This data comparison is not case-matched for patient complexity and/or disease status and may not be comparable across these surgical modalities. Past customer experience does not imply any guarantee of results in practice or program success.</p> <p>Cost estimates described here have been independently generated by Intuitive Surgical, Inc. using cost modeling methodology based on national averages, and have not been published or peer-reviewed. Cost calculations include intraoperative instrument and accessory costs. Costs related to da Vinci system acquisition, yearly service costs and other intraoperative and post-operative hospital costs are not included/considered.</p> <p>When considering cost-effectiveness of an advanced technology like the da Vinci system, we recommend that hospitals perform a full cost-benefit analysis, considering not just the operating room costs but the costs associated with hospital stays, procedure-related complications and hospital re-admissions.</p>						<p>The data discussed here is drawn from a variety of databases and sources, all of which have potential inaccuracies. This information does not include any data that can be used to identify individual patients or physicians.</p> <p>In order to provide benefit and risk information, Intuitive Surgical reviews the highest available level of evidence on representative da Vinci surgery procedures. Intuitive Surgical strives to provide a complete, fair and balanced view of the clinical literature. However, a quoted article may not be reflective of the broader literature and our materials should not be seen as a substitute for a comprehensive literature review for inclusion of all potential outcomes. We encourage patients and physicians to review the original publications and all available literature in order to make an informed decision. Clinical studies are available at pubmed.gov.</p>					
<p>INTUITIVE.</p>						<p>PN 1018713-US Rev I 08/2018 2</p>					

Purpose of slide:

Frame the conversation; establish the baseline as national data.

Statement:

Before we begin, I want to establish the frame of reference for slides highlighting outcomes from peer-reviewed literature which, for the most part, is based on national data. Economic estimates have been computed based on cost modeling of data from published studies. Intuitive Surgical has not independently validated the underlying data and estimates in the following slides should be read as directional.

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# Meeting Objectives

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## <Hospital> Business Alignment Meeting Agenda

<Hospital / IDN> objectives and goals

Introduction of Ecosystem

da Vinci® surgery results relative to goals

National da Vinci surgery trends

<Hospital / IDN> local market trends and opportunities

Solutions and next steps

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Purpose of slide:

Outline agenda for the meeting.

Probes:

“Is there anything else that you would like to discuss today that is not captured in this agenda?”

Statement:

During the next hour, our goal is to better understand your strategic initiatives and objectives, and give you insight into specific solutions that Intuitive Surgical can recommend and offer.

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**<Hospital/IDN>  
Objective and Goals**

<Customize with hospital objectives>

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**Purpose of slide:**

Understand the primary hospital goals and objectives:

E.g. – recruit surgeons, expand MIS offering in specialty area, increase catchment area, etc.

Understand what hospital has done so far to achieve their goals and where they currently stand on each goal.

**Probes:**

“Are there strategic objectives that are more important than others? Why?”

“What is the value of an incremental patient? How do you measure that?”

“What is the impact of future pay-for-performance and value-based healthcare?”

“Why do x number of patients in your catchment area choose other hospitals for open surgery?”

**Statements:**

Our goal in today's discussion is to align our focus and efforts with your objectives and measure the impact.

On an annual basis the leadership will need to justify and evaluate their program to the board. We use this and future alignment meetings as our guide to ensure we are doing activities that drive the business plan.

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Purpose of slide:

Open the conversation with overall objectives of the meeting to ensure both the presenter and audience are aligned.

Statements:

Let's begin by reviewing the agenda and objectives of today's meeting.

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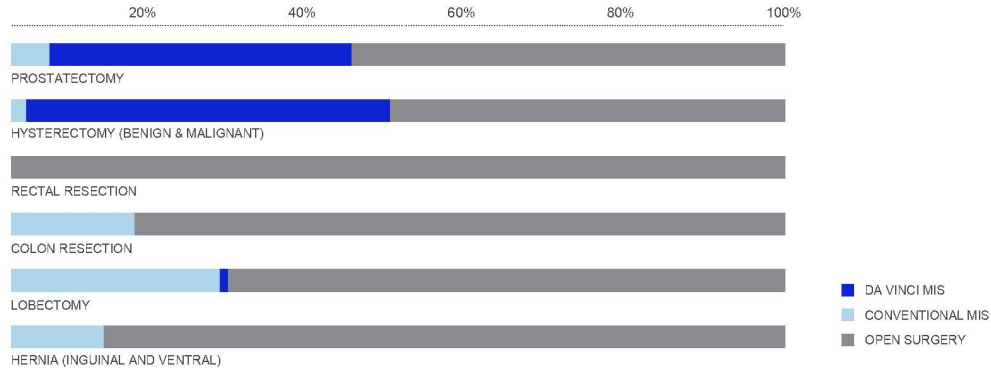
# Connected Continuum

with the Ecosystem

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## Evolution of Minimally Invasive Surgery

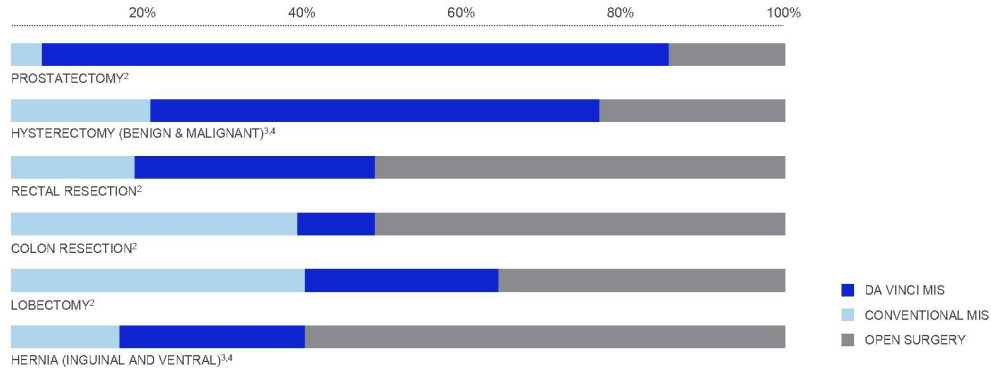
2008: Conventional MIS begins to reach its peak in clinical adoption in several procedures<sup>1</sup>



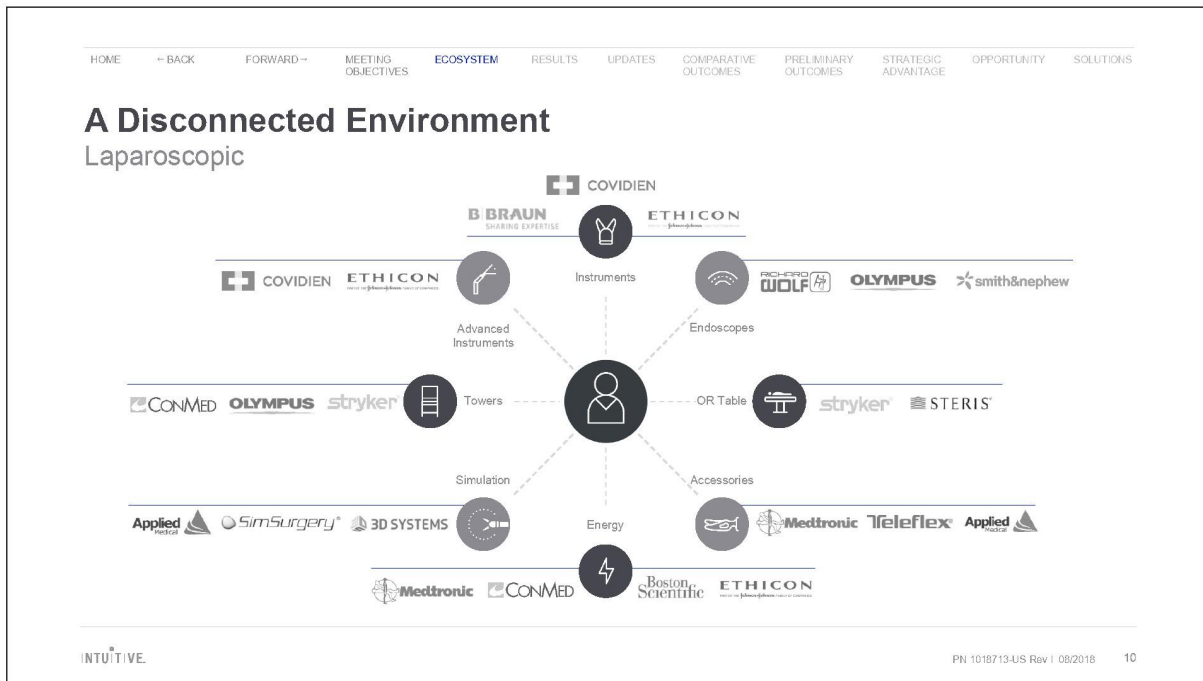
<sup>1</sup> Intuitive Surgical internal estimates based on Q1 of 2008 national Premier database. Analysis and data, including ICD-9 codes, are on file at Intuitive Surgical. Sources for market share estimates are based on data purchased for that year. Data and conclusions should be considered preliminary unless published in a peer-reviewed journal. NOTE: Ventral Hernia Repair market share numbers include only primary procedures.

## Evolution of Minimally Invasive Surgery

2017: da Vinci® Surgery enabling the expansion of MIS

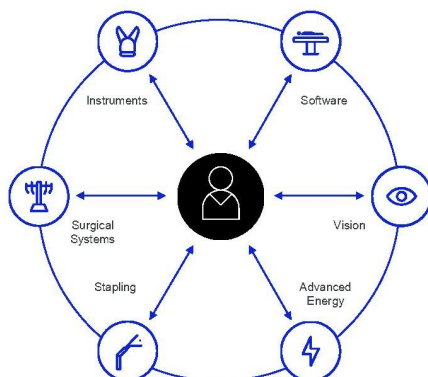


<sup>2</sup> Intuitive Surgical internal estimates based on Q1 of 2017 national Premier database for open, conventional MIS and da Vinci procedures. <sup>3</sup> Intuitive Surgical internal estimates based on Q1 of 2017 national Premier database for open procedures. <sup>4</sup> Intuitive Surgical internal estimates based on Q1 of 2017 JP Morgan analysis and data for da Vinci procedures. For sources 3,4, conventional MIS market share is based on the remaining share once open and da Vinci shares have been applied. Hernia and hysterectomy da Vinci data is sourced from JP Morgan given limitations in ICD-10 code reporting in Premier database beginning in Q4 2015. Data and analysis, including ICD-10 codes, are on file at Intuitive Surgical. Sources for market share estimates are based on data purchased for that selected year. Data and conclusions should be considered preliminary unless published in a peer-reviewed journal.



## Da Vinci® Innovation and Integration by Intuitive

Completely integrated system of technology solutions for MIS





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# Da Vinci® Ecosystem by Intuitive

Innovation & Integration

Patients, Surgeons & Hospitals

\*Training offered by Intuitive is limited to the use of its products and does not replace the necessary medical training and experience required to perform surgery. Intuitive additionally facilitates various educational and training opportunities conducted by licensed medical professionals.

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Our seamlessly integrated technologies empower physicians to deliver superior outcomes. Intuitive effectively represents the capital equipment, vision, instruments, advanced technology companies – all in one place.

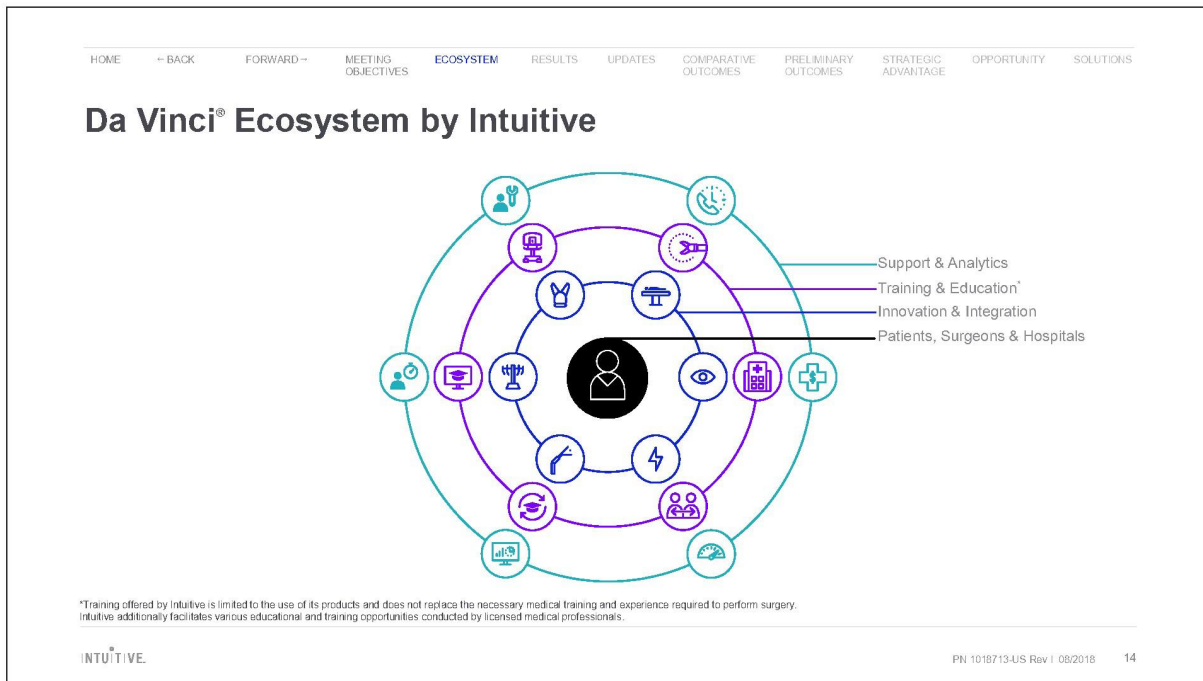
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## Da Vinci® Ecosystem by Intuitive

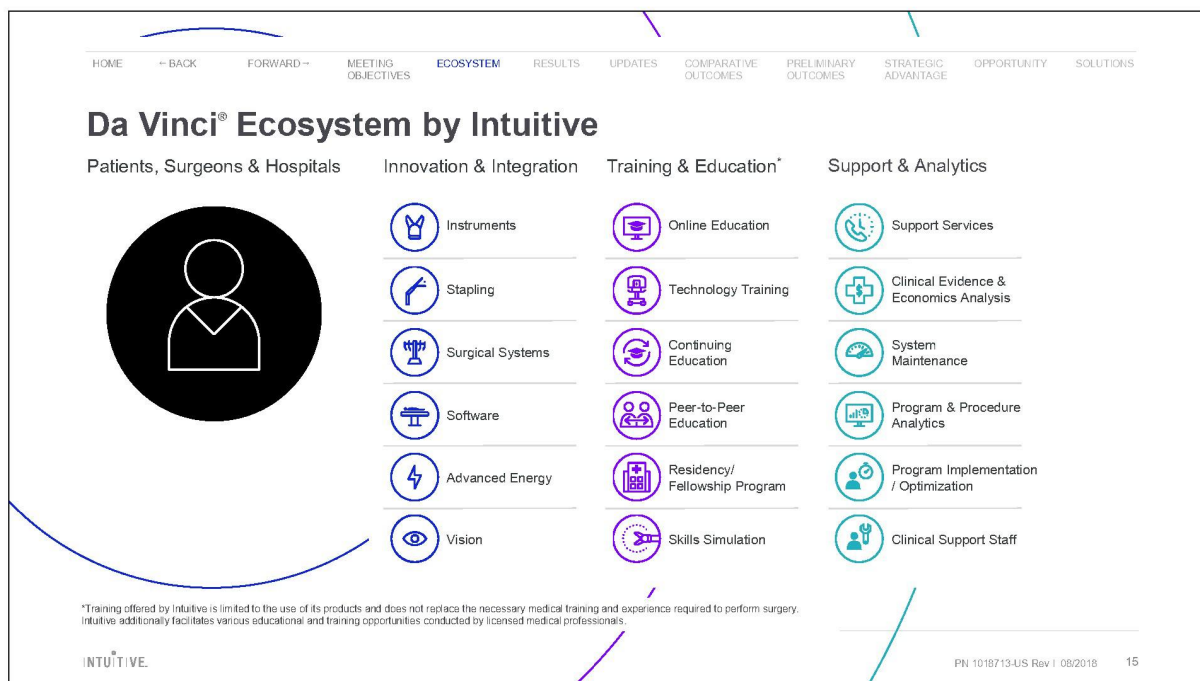
\*Training offered by Intuitive is limited to the use of its products and does not replace the necessary medical training and experience required to perform surgery. Intuitive additionally facilitates various educational and training opportunities conducted by licensed medical professionals.

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Our seamlessly integrated technologies empower physicians to deliver superior outcomes. Intuitive effectively represents the capital equipment, vision, instruments, advanced technology companies – all in one place.

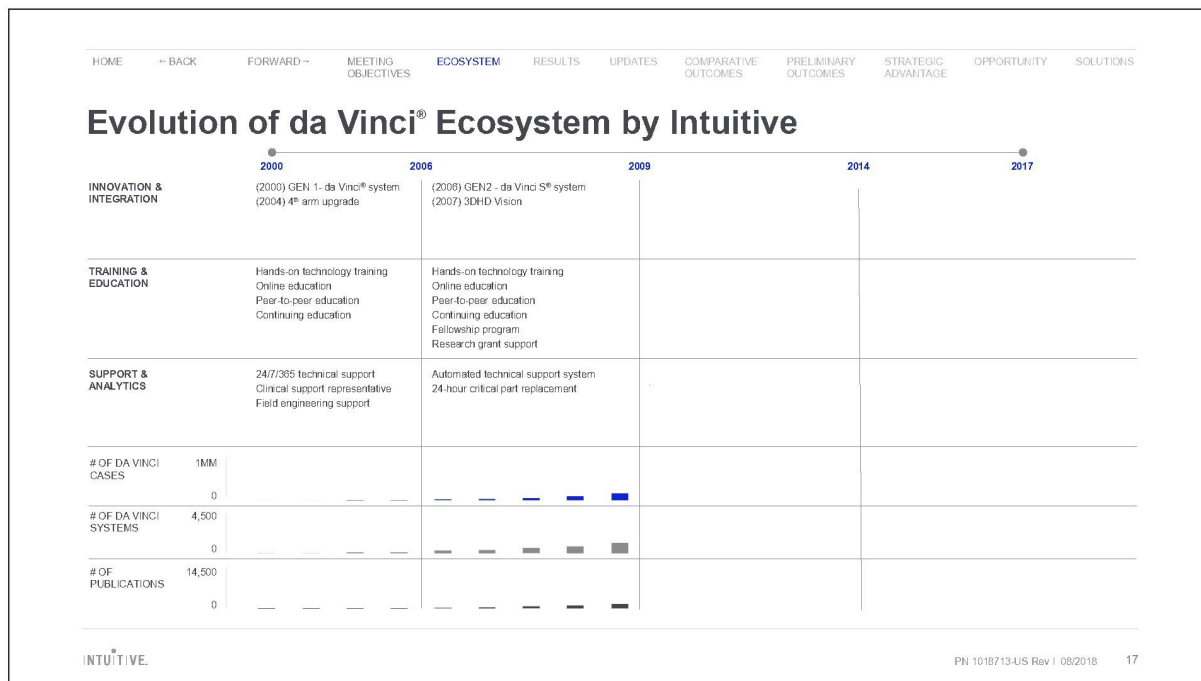


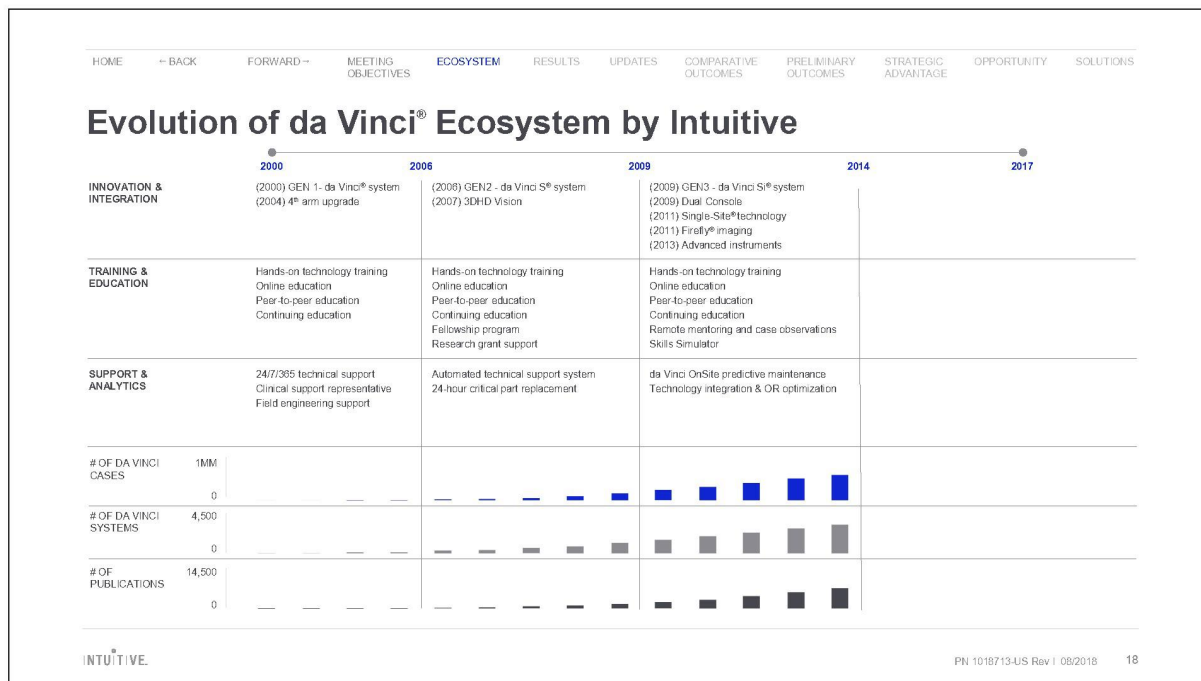
Our seamlessly integrated technologies empower physicians to deliver superior outcomes. Intuitive effectively represents the capital equipment, vision, instruments, advanced technology companies – all in one place.

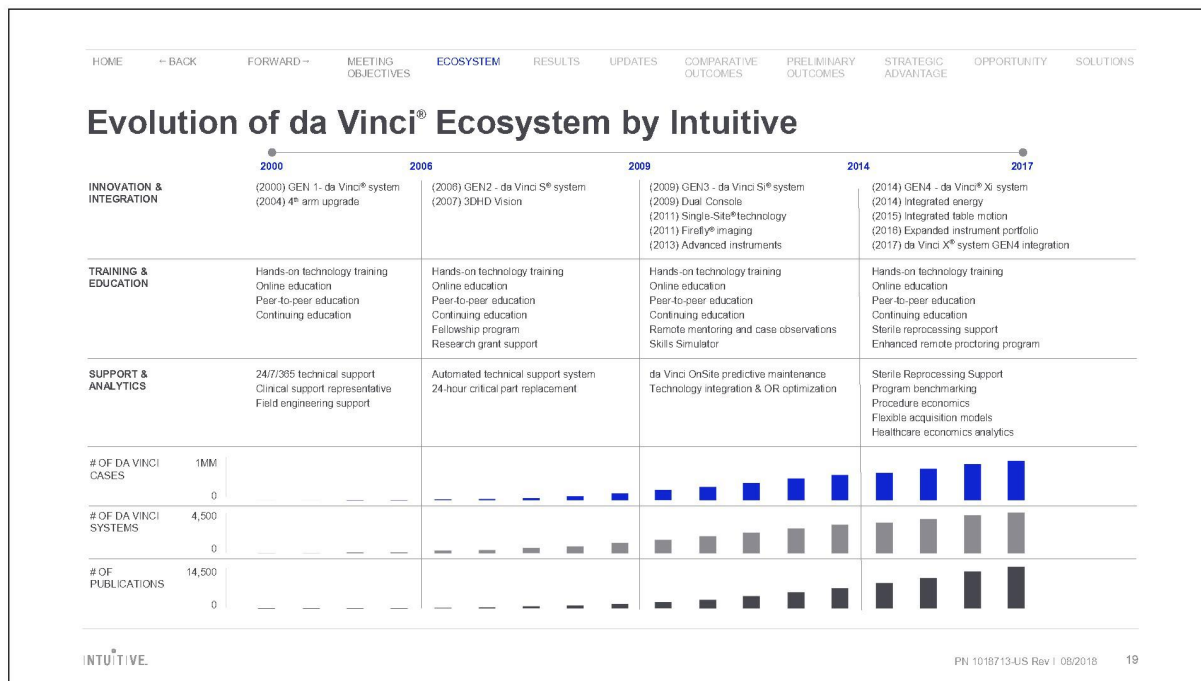


Our seamlessly integrated technologies empower physicians to deliver superior outcomes. Intuitive effectively represents the capital equipment, vision, instruments, advanced technology companies – all in one place.







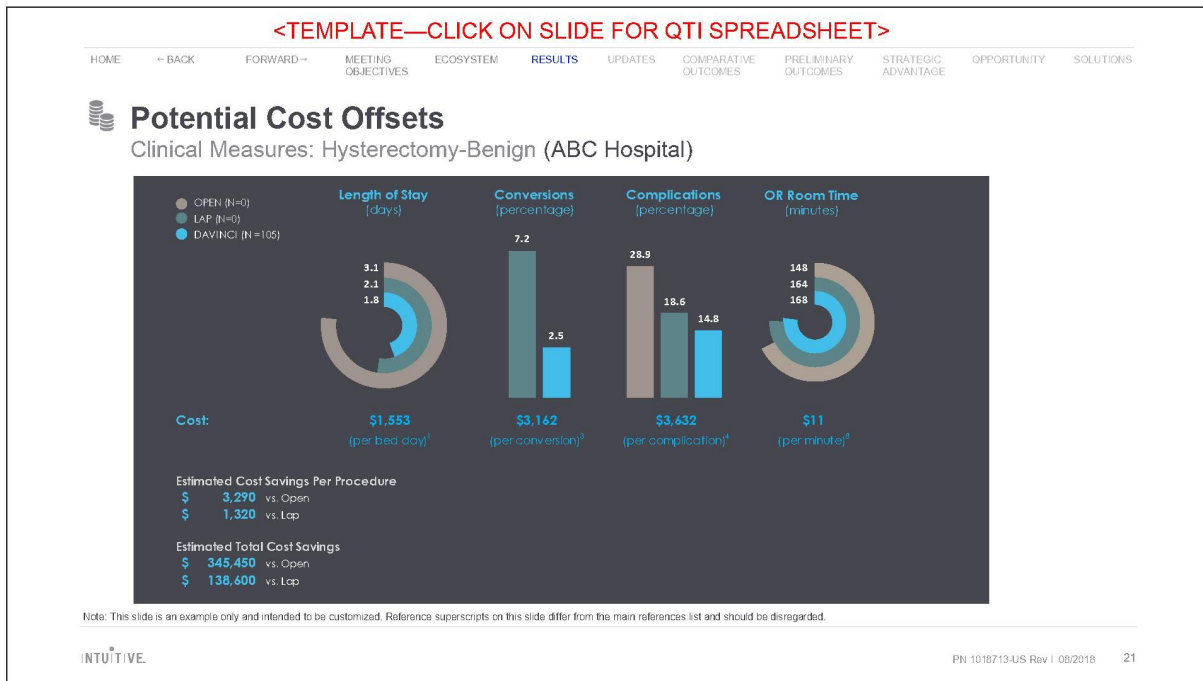




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# Da Vinci® Surgery Results

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Note: This slide is an example only and intended to be customized. Reference superscripts on this slide differ from the main reference list and should be disregarded.

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# Updates

National & Regional Trends

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## Measurable Value with da Vinci® Surgery

CLINICAL

COST

STRATEGIC

DAVINCI® MEASURABLE VALUE

INTUITIVE.

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Purpose of slide:

Define a framework for value equation.

Statement:

I'd like to review the core elements of a value equation that applies to any service line.

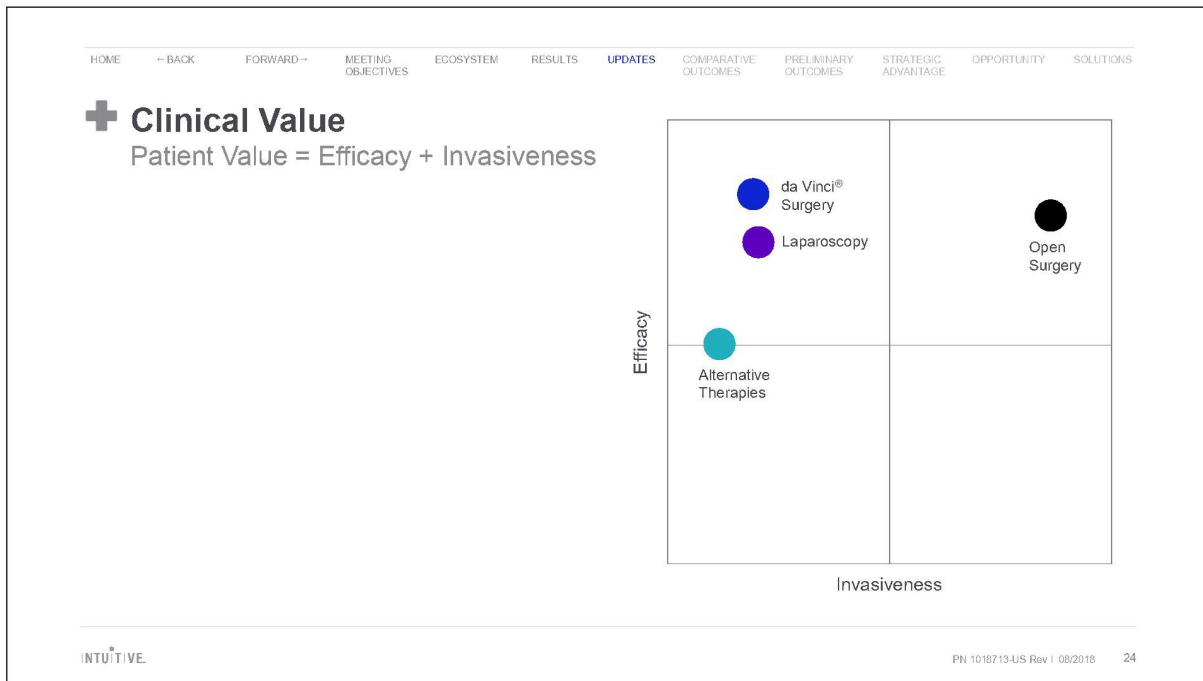
First is clinical/quality over cost. They represent 2 sides of the same coin. Not only is health care reform moving towards a payment system based on quality over cost, but enhanced quality can impact the cost to treat.

At the same time, there are likely strategic reasons for investing or reinvesting in a da Vinci surgery service line. Much of this value can be driven by clinical value and also can have a direct impact on the economics of a program.

Probes:

"Does this value equation resonate with your practice or hospital?"

"How have you defined success clinically, economically and strategically for your da Vinci surgery service line?"

**Objective:**

Demonstrate the thought process a patient goes through when contemplating surgical options and how Intuitive Surgical strives to provide patient value.

**Statement:**

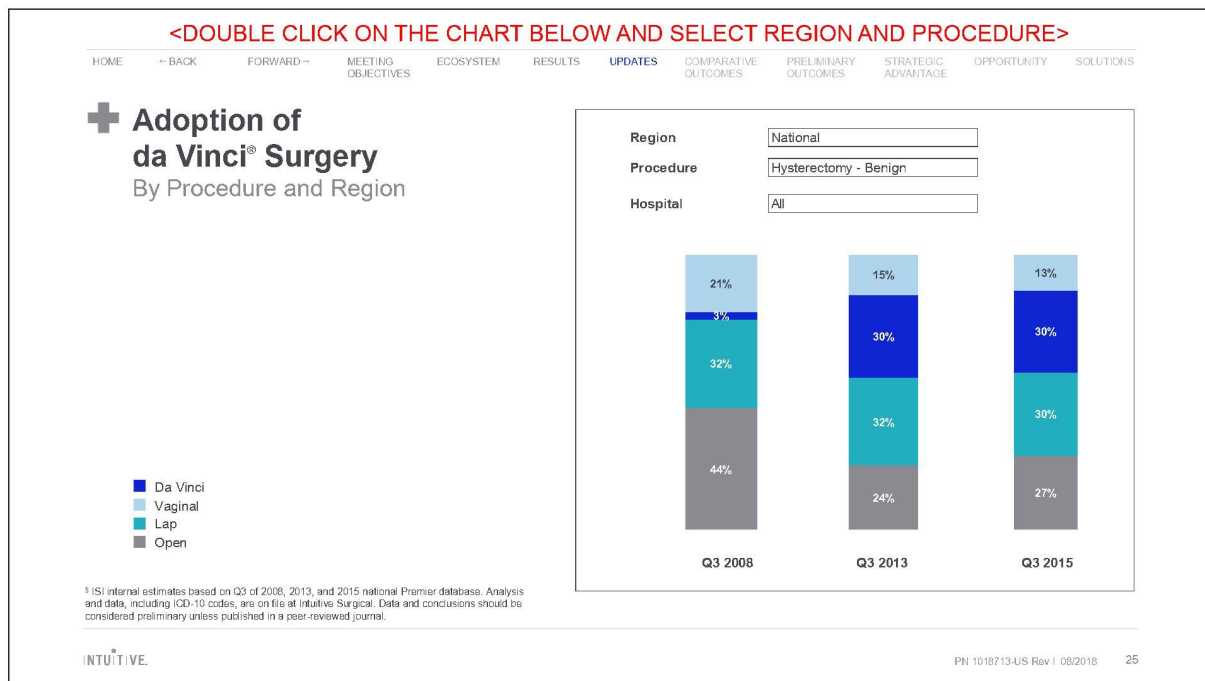
Patient value serves as the foundation of Intuitive Surgical and the products and services it provides.

Alternative therapies have been brought to market for decades with the goal of minimizing invasiveness and maintaining, if not surpassing, the efficacy of open surgery.

Prior to the introduction of da Vinci Surgery, surgeons were forced to compromise efficacy for invasiveness (as evidenced by alternative therapies such as radiation or laparoscopy).

**Probes:**

"Does this patient value equation resonate with your practice or hospital?"



#### Purpose of slide:

After validation of da Vinci surgery enabling MIS nationally and discussions around the future of emerging procedures, share insights on the adoption of these procedures within the hospital region.

#### Statements:

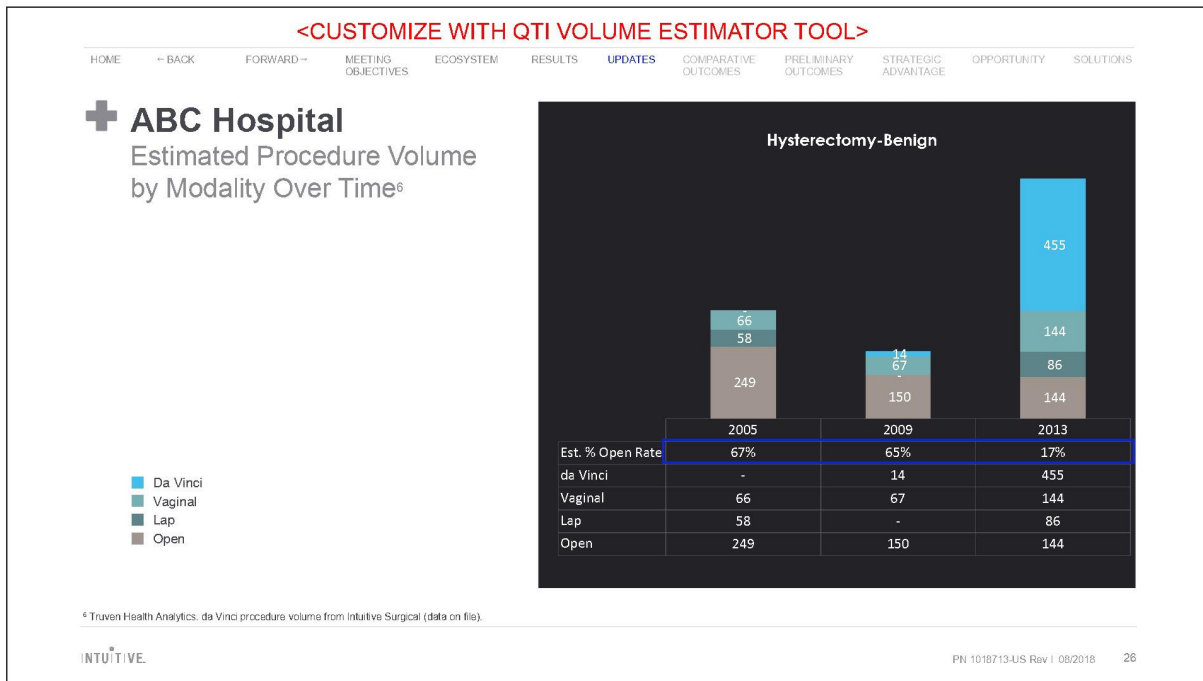
Now that we've reviewed the impact that da Vinci surgery has had on MIS for established procedures and have discussed the opportunities of enabling MIS in emerging procedures at a national level, let's take a look at the impact da Vinci surgery has had within your region.

#### Probes:

"Are these results as you expected for your region?"

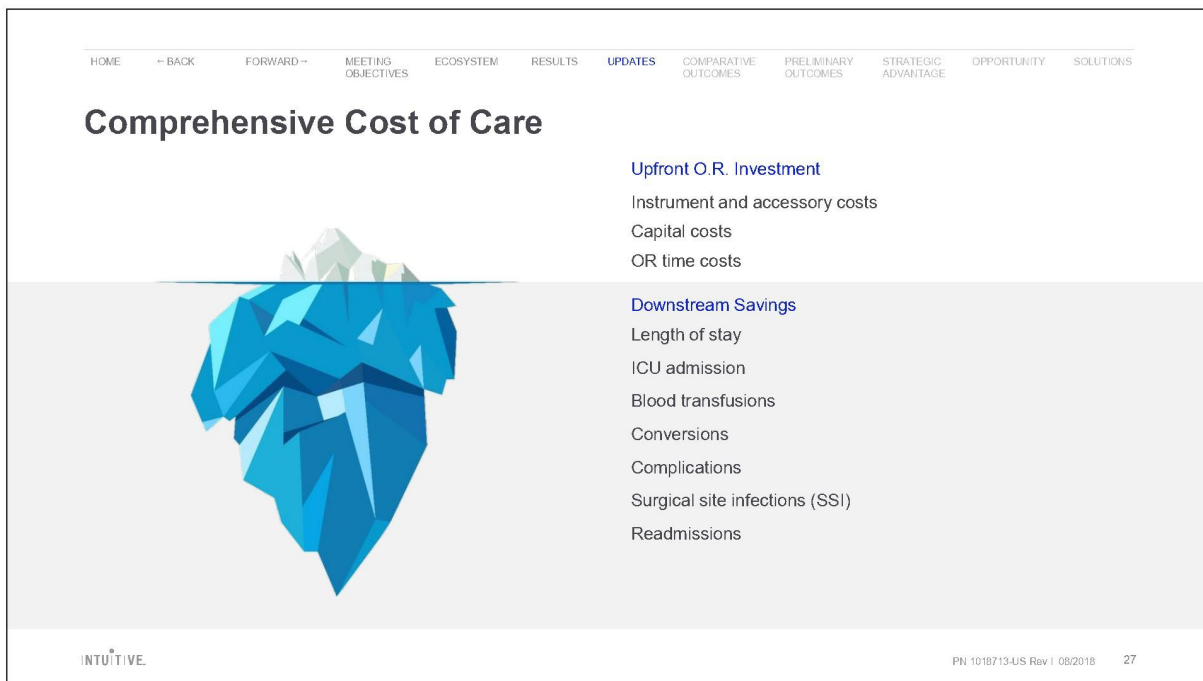
#### Sources:

5. ISI internal estimates based on Q1 2008 through Q3 2015 national Premier database. Analysis and data, including ICD-9 codes, are on file at Intuitive Surgical. Data and conclusions should be considered preliminary unless published in a peer-reviewed journal. NOTE: procedure adoption numbers are snapshots of the third quarter of 2009, 2012 and 2015



Source:

6. Truven Health Analytics. da Vinci Volume from Intuitive Surgical (data on file)



**Purpose of slide:**

Highlight that from a cost standpoint, instruments and accessories are just the “tip of the iceberg” as it relates to the total cost to treat.

**Statements:**

The adoption of da Vinci surgery in the markets presented earlier was driven by differentiated clinical benefits which may be more meaningful from a value perspective if they can be measured in monetary terms.

As hospitals evaluate the total cost to treat da Vinci surgery patients, more often than not, a lot of scrutiny is placed on the costs of da Vinci instruments and accessories.

Capital costs - some institutions want to view capital and service as a fixed cost and it gets allocated across all service lines. If capital depreciation is included in the financials of da Vinci surgery, all service and capital in the OR should be treated similarly across surgical modalities (i.e., laparoscopic capital equipment amortization).

With operative time, we recommend exploring your times and cost for your surgeons.

This is an incomplete view unless you quantify the potential cost offsets associated with clinical measures such as LOS, ICU admission, conversions, complications, surgical site infections, PACU time, readmissions and blood transfusions.

**Probes:**

“Would you agree that these clinical measures have a significant effect on the total cost to treat patients?”





### Purpose of slide:

Show the national cost average data for typical hospital costs associated with surgery. This will be the basis for national cost averages and savings highlighted on the next several slides.

### Statements:

Now that you have seen some of the latest clinical opportunities and trends in the U.S. and your region, let's take a look at how customers around the nation are starting to look at the total cost of care with regards to da Vinci surgery. These are national cost averages for specific clinical endpoints based on Intuitive Surgical's healthcare economic team's research, and then reviewed and validated by an independent 3rd party consulting firm: Precision Health Economics – who has 5 offices in the US and is comprised of current and former tenured university academicians.

<http://www.precisionhealtheconomics.com/about-phe>

Your individual hospital figures will undoubtedly differ from these figures, but these are as accurate as possible for a nationwide sample.

We will use these calculations on the next slides to help us try and dollarize MIS cost savings via da Vinci surgery.

### Probes:

Are you familiar with Precision Health?

Do these figures seem reasonable averages and proxies for each category?

### Data Source:

h. Halpern NA, Pastores SM. Critical care medicine in the United States 2000-2005: an analysis of bed numbers, occupancy rates, payer mix, and costs. Crit Care Med 2010;38(1):65-71. Note: Cost updated to 2014 using medical services consumer price index (CPI).

b. Weighted average based on 2013 Premier Database data of robotic and laparoscopic conversion costs. Premier Database. 2013. Analysis and data, including ICD-9 codes, are on file at Intuitive Surgical. Note: Cost updated to 2014 using medical services consumer price index (CPI).

f. Agency for Healthcare Research and Quality. HCUPnet: A tool for identifying, tracking, and analyzing national hospital statistics. All patient readmissions within 30-days. National statistics, 2012. (Index stay - 124 Hysterectomy, abdominal and vaginal) or (Index stay - 44 Coronary artery bypass graft (CABG)).

c. DRG multiplier calculated based on data from Vonlanthen R, Slankamenac K, Breitenstein S, et al. The impact of complications on costs of major surgical procedures: a cost analysis of 1200 patients. Ann Surg. 2011;254(6):907-913.

e. Zimlichman E, Henderson D, Tamir O. Health care-associated infections: a meta-analysis of costs and financial impact on the US health care system. JAMA Intern Med. 2013 Dec 9-23;173(22):2039-46. doi: 10.1001/jamainternmed.2013.9763.

### More information on Precision Health:

Led by tenured professors at elite research universities, we bring intellectual integrity, academic rigor, and a creative approach

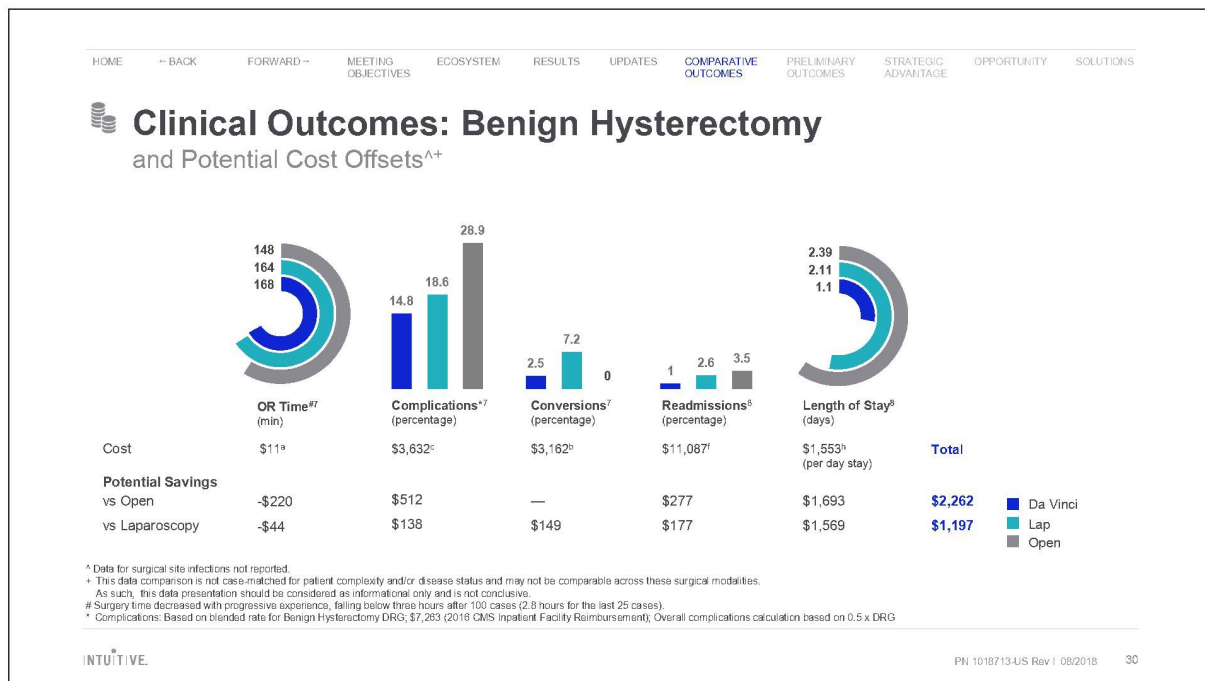
to the most challenging problems in health care.

Our team is comprised of a diverse and multi-disciplinary group of distinguished scholars, clinicians, and health care professionals who share a deep commitment to studying and improving healthcare. Our partners, Dana Goldman, Darius Lakdawalla, and Tomas Philipson, have built national and international reputations for excellence within the health care field — consistently setting the bar for achievement in health care research.

Our network of experts span leading academic institutions: Harvard, Stanford, Wharton, Chicago, MIT, Cornell, USC, UCLA. The economists and physicians who collaborate with us are national authorities in their respective fields. They are Nobel Prize and Clark Medal winners. We bring professionals experienced with government agencies (e.g., CMS and FDA) and industry (e.g., payers and life sciences).

# Comparative Outcomes

From Peer Reviewed Publications



### Purpose of slide:

Give a comprehensive view of what a da Vinci surgery vs. Open vs. Laparoscopy cost offset could look like for benign hysterectomy procedures.

### Statements:

Overall, you can see that when you look beyond supply costs and consider the potential improvement in outcomes based on a national database study, the impact of the total cost to treat patients can represent significant cost savings to hospitals.

Luciano study shows that with experience (after 100 cases), OR time fell below 3 hours (for the last 25 cases).

Please know, these costs may vary per hospital. In the absence of robust hospital specific cost data, these reference costs may be used to assess the economic value of improved patient outcomes.

Clinical data is based on a Luciano study that reviewed comparative outcomes from 289,875 hysterectomies from 156 US hospitals in Premier Research Database.

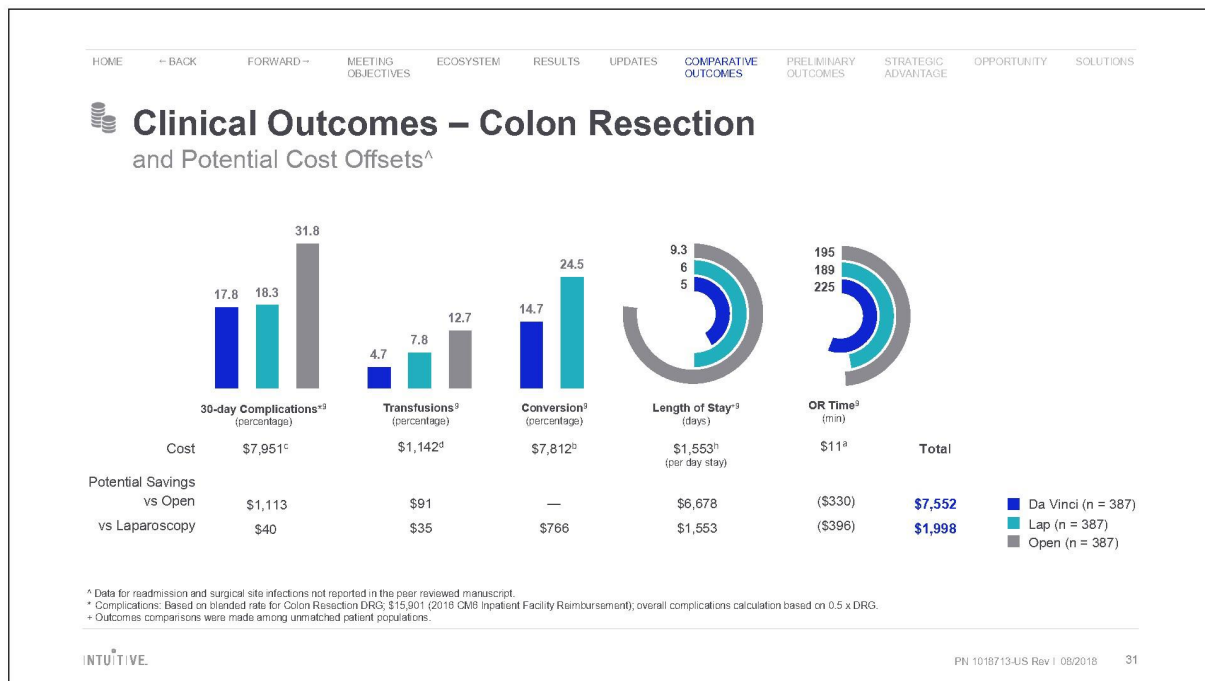
Length of stay reference (including both inpatient and outpatient) is based on the Marty Martino study which took a retrospective review of 2,552 patients from 2008 to 2012 at Lehigh Valley Health Network in Allentown, PA.

### Data Sources:

7. Luciano AA, Luciano DE, Gabbert J and Seshadri-Kreaden U. The impact of robotics on the mode of benign hysterectomy and clinical outcomes, Int J Med Robot 2015 March. doi: 10.1002/rcs.1648.

8. Martino, Martin A. et al. A Comparison of Quality Outcome Measures in Patients Having a Hysterectomy for Benign Disease: Robotic vs. Non-robotic Approaches. Journal of Minimally Invasive Gynecology, Volume 21, Issue 3, 389 – 393

\* Complications: Based on blended rate for Benign Hysterectomy DRG; \$7,263 (2016 CMS Inpatient Facility Reimbursement); Overall complications calculation based on 0.5 x DRG



### Purpose of slide:

Give a comprehensive view of what a da Vinci surgery vs. open vs. laparoscopy cost offset could look like for colon resection procedures.

### Statements:

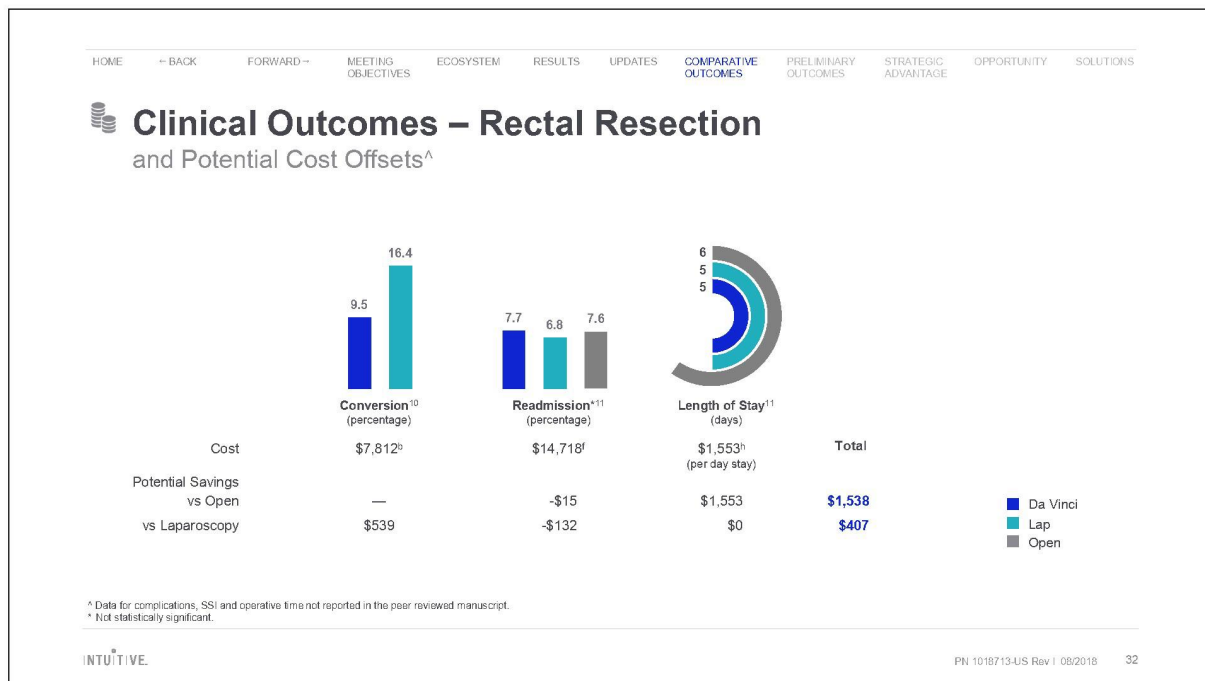
Overall, you can see that when you look beyond supply costs and consider the potential improvement in outcomes based on a national database study, the impact of the total cost to treat patients can represent significant cost savings to hospitals. Please know, these costs may vary per hospital. In the absence of robust hospital specific cost data, these reference costs may be used to assess the economic value of improved patient outcomes.

Clinical data is based on a Cigdem Benlice study that was based on the ACS-NSQIP database and examined outcomes before and after frequency matching across the 3 surgical approaches. This study involved patients undergoing elective colectomy in 2013.

### Data Sources

9. Benlice, C., Aytac, E., Costedio, M., Kessler, H., Abbas, M. A., Remzi, F. H., and Gorgun, E. (2016), Robotic, laparoscopic, and open colectomy: a case-matched comparison from the ACS-NSQIP, Int J Med Robotics Comput Assist Surg, doi: 10.1002/rcs.1783  
 Note: Complications reported as morbidity in paper

Complications: Based on blended rate for Colon Resection DRG; \$15,901 (2016 CM6 Inpatient Facility Reimbursement); Overall complications calculation based on 0.5 x DRG



### Purpose of slide:

This slide gives a comprehensive view of what a da Vinci surgery vs. Open vs. Laparoscopy cost offset could look like for rectal resection procedures.

### Statements:

Overall, you can see that when you look beyond supply costs and consider the potential improvement in outcomes based on a national database studies, the impact of the total cost to treat patients can represent significant cost savings to hospitals. Please know, these costs may vary per hospital. In the absence of robust hospital specific cost data, these reference costs may be used to assess the economic value of improved patient outcomes.

Clinical data is based on:

Speicher PJ study based on the national cancer database examining short-term outcomes and pathologic surrogates of oncologic results among patients undergoing robotic versus laparoscopic low anterior resection for rectal cancer. A total of 6403 patients met inclusion criteria.

Midura study utilizing weighted Healthcare Cost and Utilization Project Nationwide Inpatient Sample data (2008, 2009) to identify the top 12 procedures for robotic general surgery.

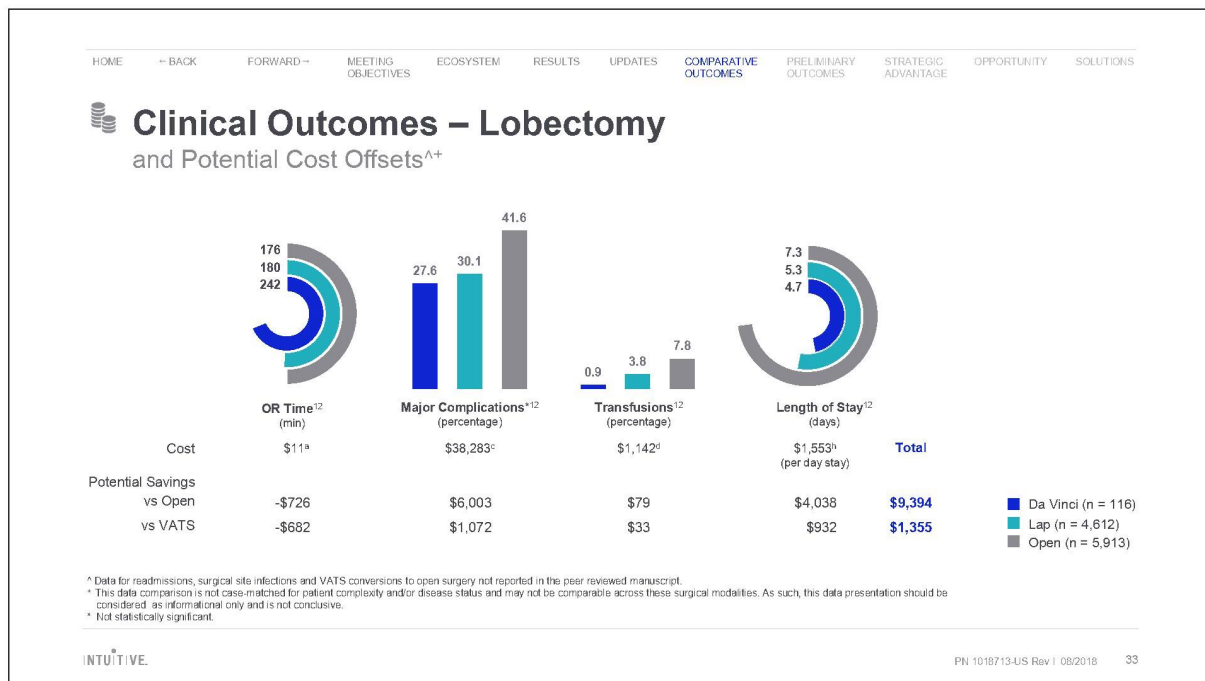
### Data Sources

10. Speicher PJ, et al. Robotic Low Anterior Resection for Rectal Cancer: A National Perspective on Short-term Oncologic Outcomes. Ann Surg. 2014 Nov

11. Midura EF, et al. The effect of surgical approach on short-term oncologic outcomes in rectal cancer surgery. Surgery. 2015 Aug;158(2):453-9. doi: 10.1016/j.surg.2015.02.020.

\* Complications: Based on blended rate for Rectal Cancer DRG; \$12,910 (2016 CM6 Inpatient Facility Reimbursement); Overall complications calculation based on 0.5 x DRG





### Purpose of slide:

This slide gives a comprehensive view of what a da Vinci surgery vs. Open vs. VATS cost offset could look like for lobectomy.

### Statements:

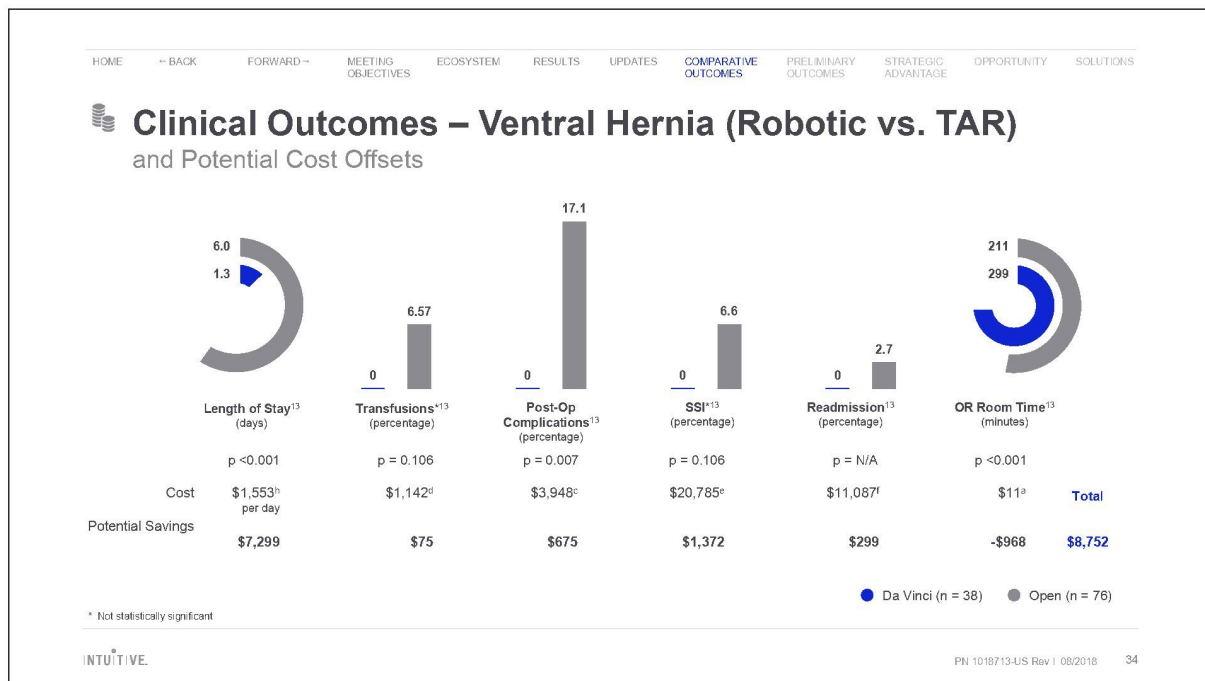
Overall, you can see that when you look beyond supply costs and consider the potential improvement in outcomes based on a national database studies, the impact of the total cost to treat patients can represent significant cost savings to hospitals. Please know, these costs may vary per hospital. In the absence of robust hospital specific cost data, these reference costs may be used to assess the economic value of improved patient outcomes.

Clinical data is based on a R. Douglas Adams study that was based on the surgeon's retrospective cases and were compared to the 2009 and 2010 STS database.

### Data Sources

12. Adams RD, et al. Initial Multicenter Community Robotic Lobectomy Experience: Comparisons to a National Database. Ann Thorac Surg 2014 June;97:1893-900. doi: 23.

\* Complications: Based on blended rate for Lung Cancer DRG; \$15,313 (2016 CM6 Inpatient Facility Reimbursement); Major complications calculation based on 2.8 x DRG



### Purpose of slide:

This slide gives a comprehensive view of what a da Vinci surgery vs. Open cost offset could look like for high-acuity ventral hernia procedures.

### Statements:

Overall, you can see that when you look beyond supply costs and consider the potential improvement in outcomes, the impact of the total cost to treat patients can represent significant cost savings to hospitals.

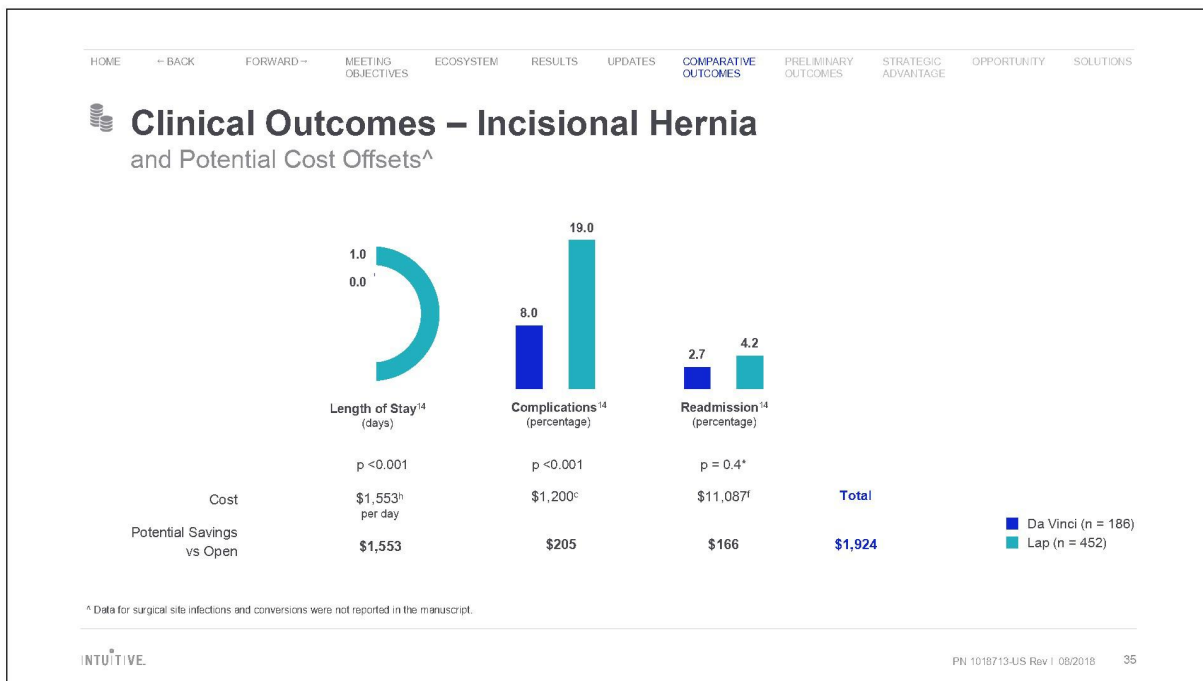
Please know, these costs may vary per hospital. In the absence of robust hospital specific cost data, these reference costs may be used to assess the economic value of improved patient outcomes.

Clinical data is based on a case-matched LA Martin-Del-Campo study.

### Data Sources

13. Campo, et al. Comparative analysis of perioperative outcomes of robotic versus open transversus abdominis release. Surg Endosc. 25 March 2017.





### Purpose of slide:

This slide gives a comprehensive view of what a da Vinci surgery vs. Open cost offset could look like for incisional hernia procedures.

### Statements:

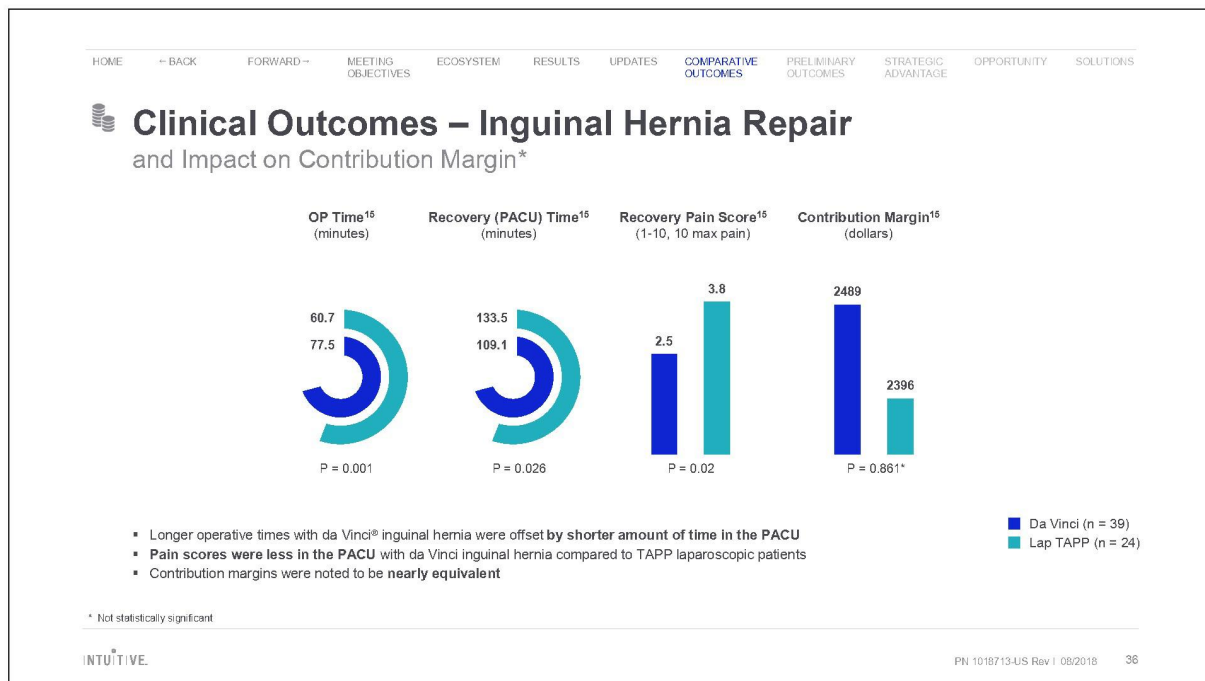
Overall, you can see that when you look beyond supply costs and consider the potential improvement in outcomes, the impact of the total cost to treat patients can represent significant cost savings to hospitals.

Please know, these costs may vary per hospital. In the absence of robust hospital specific cost data, these reference costs may be used to assess the economic value of improved patient outcomes.

Clinical data is based on a propensity score matched AS Prabhu study that compared matched groups within the AHSQC database

### Data Sources

14. Prabhu, et al. Laparoscopic vs Robotic Intraperitoneal Mesh Repair for Incisional Hernia: An Americas Hernia Society Quality Collaborative Analysis. J Am Coll Surg 2017



### Purpose of slide:

Highlight a comparative analysis of a da Vinci surgery vs. laparoscopy for inguinal hernia repair and suggest they have comparable clinical outcomes.

### Statements:

The early evidence supports da Vinci surgery providing comparable outcomes relative to laparoscopy. The data highlighted here is based on an internal analysis of the Premier database from 2011-2015 that is specific to unilateral inguinal hernias. It should be noted that this is not a case-matched analysis due to the limited number of inguinal hernia patients that can be matched in the Premier database. As we gather more data, we will continue to validate the clinical value. Lastly, da Vinci surgery is associated with a higher operative time (wheels in to wheels out) although it is difficult to control for surgeons going through their learning curve in the Premier data set.

### Source:

15. Kimberly E. Waite, Comparison of robotic versus laparoscopic transabdominal preperitoneal (TAPP) inguinal hernia repair, J Robotic Surg DOI 10.1007/s11701-016-0580-1

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## Optimize Instruments and Accessories Cost

Sandeep S. Vijan, MD - Inguinal Hernia Repair<sup>16</sup>

Instrument	da Vinci <sup>®</sup>	Laparoscopic
<b>Total (excluding mesh cost)</b>	<b>\$1,049</b>	<b>\$1,794</b>
Scissors	\$320	—
Mega Needle Driver	\$280	—
Spacemaker Balloon	—	\$750
Tacker (x1)	—	\$399
Bipolar Grasper	\$200	—
Lap Tray	—	\$480
Suture	\$60	\$15
Drapes/Trocars	\$189	\$150

\* Estimate generated using financial data provided by Parkview Medical Center, Pueblo, CO. This data presentation should be considered as informational only and is not conclusive. Based on a single institution and may not be reproducible or generalizable.

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#### Purpose of slide:

Use this slide to correct the misperception that da Vinci I&A costs are far higher than typical laparoscopic supply costs.

#### Statements:

There is often a misperception that da Vinci Surgery supply costs are significantly more expensive than those of laparoscopy. When we consider the reusable nature of da Vinci instruments (relative to disposable lap instruments) along with common instrument and accessories for both modalities, we find that the cost of da Vinci supplies is relatively in line or less than those of lap.

In this example, you will find that the elimination of certain instruments such as tackers in robotic ventral hernia repairs can have significant cost reduction implications.

#### Probes:

Did you know that the instrument and accessory costs for da Vinci for Ventral Hernia are less than laparoscopic instrument and accessory costs?

Whatever the differences in supplies costs, in the scenario in which da Vinci surgery represents an increase in supply cost, it is important to evaluate value comprehensively vs. outcomes...do you agree?

Does da Vinci surgery offer a potential strategic revenue advantage; for example, a better payer mix?

#### Data Source:

16. Estimate generated using financial data provided by Parkview Medical Center, Pueblo, CO. This data presentation should be considered as informational only and is not conclusive. Based on a single institution and may not be reproducible or generalizable.

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# Preliminary Outcomes Analysis

of Premier Perspective Database

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## Propensity Score Matched Preliminary Analysis of the Premier Perspective Database

### Methodology

**Data source** Premier Database capturing procedure data for over 700 U.S. hospitals

**Study time frame** FY 2008-2015Q3

**Patient population**

Hysterectomy - Benign	Lobectomy	R. Colectomy (Cancer)
Hysterectomy - Malignant	Prostatectomy	Sigmoidectomy
LAR - Cancer	R. Colectomy (Benign)	Ventral Hernia

**Measures** by procedure and geography:

Inpatient length of stay	Complications
Transfusions	SSIs
Conversions MIS to Open	OR time

**Propensity score matching** based on covariates such as:

Age	Obesity	Physician volume
Gender	Admission type	Hospital bed size
Race	Charlson comorbidity score	Teaching hospital status
Payor	U.S. census region	Urban/rural

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Purpose of slide:

Share the methodology for selection, analysis and usage of the Premier Perspective Database.

Statements:

For procedures that have long been performed using the da Vinci System, like prostatectomy and benign hysterectomy, there is a wealth of comparative peer reviewed publications based on multiple institutions and/or national database studies. The Premier Perspective Database provides both national and regional outcome insights that validate the clinical value of da Vinci surgery in literature using a consistent methodology and demonstrate value for emerging procedures where published literature is limited.

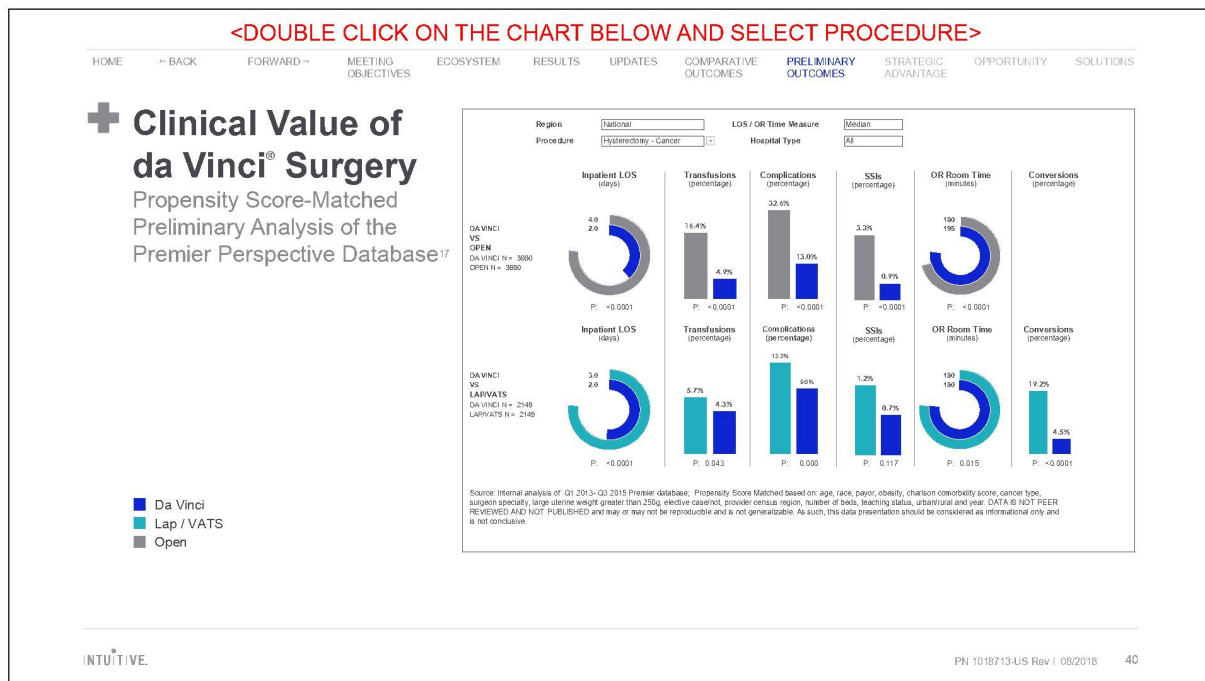
The Premier Perspective database represents ~40% of all hospital discharges (inpatient and outpatient) and is populated by a collaboration of both academic and community non-profit organizations.

The data we will be reviewing is based on discharges of patients from over 700 hospitals from 2008 through Q3 of 2015.

Propensity score-matched preliminary analyses have been performed for core da Vinci procedures.

Measurements included in the analysis are inpatient length of stay, transfusions, MIS to open conversions, overall complications, surgical site infections and OR time.

The data represented in the following slide has been propensity score-matched which ensures the selected patient, hospital and geographic characteristics are as similar as possible in order to limit bias or in other words, to compare apples to apples. The patient characteristics or covariates selected have been found to bias outcomes. Examples of these covariates are age, obesity, race, admission type and Charlson comorbidity score.



Purpose of slide:

Demonstrate the clinical value of da Vinci surgery based on a rigorous statistical analysis of the Premier Perspective Database. Customize the data display by 1) national and regional, 2) procedure type, and 3) median and mean views.

Statements:

The data highlighted here is based on an internal analysis of the Premier database from 2013 through Q3 2015. This data has been propensity score matched which ensures the selected patient and hospital characteristics are as similar as possible in order to limit bias.

For the majority of procedures, da Vinci surgery is associated with comparable if not better clinical outcomes to open and laparoscopic/VATS surgery. When you consider the potential improvement in outcomes based on the Premier data, the impact on the total cost to treat patients can represent significant cost savings to hospitals.

LOS

Statements

When looking at Inpatient LOS, da Vinci surgery has a lower LOS compared to open and is comparable, and sometimes lower than laparoscopic surgery. The LOS shown here is the median (or 50th percentile) as these values are most in line with the LOS you'll find in most published literature. However, we can also view the mean or average LOS for this procedure in your region. As you will see, the mean LOS tends to be higher than the LOS you may see at your hospital because this data accounts for outliers that drive up the average LOS. You will see similar results of median vs. mean for OR time. Regardless of viewing outcomes through a median or mean metric, robotic surgery has a comparable or lower LOS compared to open and laparoscopic surgery. (\* Exceptions: Lobectomy – Midwest, da Vinci vs. lap, R. Colectomy Ben – Northeast, da Vinci vs. lap, R. Colectomy Can, da Vinci vs. lap). Note: hyst-benign LOS may look higher than expected but the premier data only accounts for patients that are admitted to the hospital and does not include outpatient (70% of hyst-benign) procedures.

Probes

Is the regional LOS in line with what you would expect to see in your region? How do your internal LOS compare to the national/regional rate?

Do you experience capacity shortages for patients presenting with some of these procedures?

When thinking about length of stay – other than the room and board costs, are there other considerations for getting a patient home sooner, i.e., hospital-acquired conditions?

What impact could LOS have on hospital patient satisfaction scores?

Blood Transfusions

Statements

Blood transfusion rate is lower than open and lower or comparable to lap for most procedures nationally. (\* Exception: R. Colectomy Can).

Probes

Is the regional blood transfusion rate in line with what you would expect to see in your region? How do your internal



transfusion rates compare to the national/regional rate?

What are the other costs associated with blood transfusions outside of direct costs? Administration of blood?

#### Complications

##### Statements

Overall complications, regardless of procedure, show favorable outcomes at a national level for da Vinci surgery vs. open surgery and most often comparable and sometimes favorable outcomes for da Vinci surgery vs. lap. This is particularly important for the pay-for-performance model as there will likely be increased scrutiny amongst payors around complication rates such as surgical site infections.

##### Probes

Is the regional complication rate in line with what you would expect to see in your region? How do your internal complication rates compare to the national/regional rate?

#### Surgical Site Infections

##### Statements

In 2016, the Hospital Acquired Conditions effort began including surgical site infections for colon surgery and abdominal hysterectomy. Medicare hospitals that underperform are penalized 1% of all Medicare reimbursement for their hospital. Reducing SSIs can represent significant cost avoidance. Based on a national cost study, the average cost per Surgical Site Infection is \$20,785. Looking at the Premier data, specifically for hysterectomy and colectomy procedures (both benign and malignant), da Vinci surgery produces lower surgical site infections compared to open surgery. The use of a MIS approach compared to an open operation avoids incremental cost.

##### Probes

Is the regional SSI rate in line with what you would expect to see in your region? How do your internal SSI rates compare to the national/regional rate?

Has your hospital seen a difference in open vs. MIS SSI rates?

#### OR Time

##### Statements

da Vinci surgery is associated with a longer operative time (wheels in to wheels out) compared to laparoscopy and open surgery. However, it is difficult to control the Premier data set for surgeons going through their learning curve. The OR time shown here is the median (or 50th percentile) as these values are most in line with the LOS you'll find in most published literature. However, we can also view the mean or average OR time for this procedure in your region. As you will see, the mean OR tends to be higher than what you may see at your hospital because this data accounts for outliers that drive up the average OR time.

##### Probes

Is the regional OR time in line with what you would expect to see in your region? How do your internal OR times compare to the national/regional rate?

Has your hospital seen a reduction in OR time as surgeons gain more experience with the da Vinci System?

How does your hospital account for OR Time? Wheels in to wheels out?

#### Conversions

##### Statements

Lastly, with respect to conversions from MIS to open, da Vinci surgery is shown to have a lower rate than that of laparoscopy for all of the procedures shown here. Avoiding a conversion is not only important to a patient, but could have ancillary benefits such as length of stay, infection risk, etc.

##### Probes

Is the regional conversion rate in line with what you would expect to see in your region? How do your internal conversion rates compare to the national/regional rate?

How does a patient react when they are scheduled for an MIS procedure and wake-up to find that they had to undergo an open procedure? Does this affect satisfaction level?

What are the other costs associated with an open procedure vs. an MIS procedure? LOS? Infections? Blood transfusions? Pain Medications?

#### Q&A

"Why did you select the Premier Database?" There are a few reasons why we selected the Premier Perspective Database for outcomes results. First, the Premier Database represents ~40% of all hospital discharges (inpatient and outpatient) or discharges of patients from over 700 hospitals. The data is populated by a collaboration of both academic and community non-profit organizations. Second, Premier goes through a rigorous process of ensuring data standardization and appropriate categorization to ensure clean and accurate data sets. Third, Premier is able to identify at the patient level and track patients across all Premier facilities which provides a large data set to allow for a statistical analysis. For the purposes of directional insights, the Premier database enables us to perform a propensity score matched analysis and provide a representative view of patient outcomes at both the national and regional level.

"We are measured and incentivized to reduce readmissions at our hospital. Why don't you display readmissions results?" While

the Premier Perspective Database is robust, there are a few limitations including readmissions results. While readmissions are captured for patients, they are only captured for hospitals within the Premier database. For example, if a patient had surgery and was released from hospital A but was later readmitted to hospital B, that readmission would not be captured, so the overall readmission rate is potentially deflated. Given this limitation, we chose not to include readmission rates in the analysis. Other limitations include only inpatient LOS (because it's based on the patient's discharge) and it has the potential to be biased as it's a retrospective database.

"Dr. A's results look quite different than the Premier results you are displaying. Shouldn't they be comparable?" There are limitations in comparing a particular surgeon's outcomes to the national database. There is no algorithm developed within the Premier database that takes into account where the surgeon is in their learning curve or their experience. In addition, the techniques being used by Dr. A could be quite different than those from the Premier database. The data presented here is simply for directional purposes.

"I'd like to see the regional outcomes for both inguinal and ventral hernia. Why are they not available here?" In order to make a statistical argument, the matched sample size needs to be large enough to provide results. If the sample size drops below 25 force matched individuals, we were not able to run the analysis as the results would be misleading. When this is the case, results will be displayed blank. In the case of inguinal and ventral hernia, these procedures are early in adoption and although we anticipate available data in the near future, there isn't enough to provide directional results at the regional level. You will also find that national data isn't included for inguinal hernia. While da Vinci surgery is comparable to lap and open for the outcomes displayed here, 96% of da Vinci inguinal hernia procedures are performed as outpatient procedures which aren't tracked in the Premier database.

"It seems like some of the data you're displaying isn't statistically significant, so is this data even accurate?" Statistical significance requires a certain sample size. For some of the outcomes displayed here, the sample size is too small to meet statistical significance. However, if you take into account the sample size displayed and how close the p-value is to statistical significance, as little as one or two more people could make the results statistically significant.

Data Source:

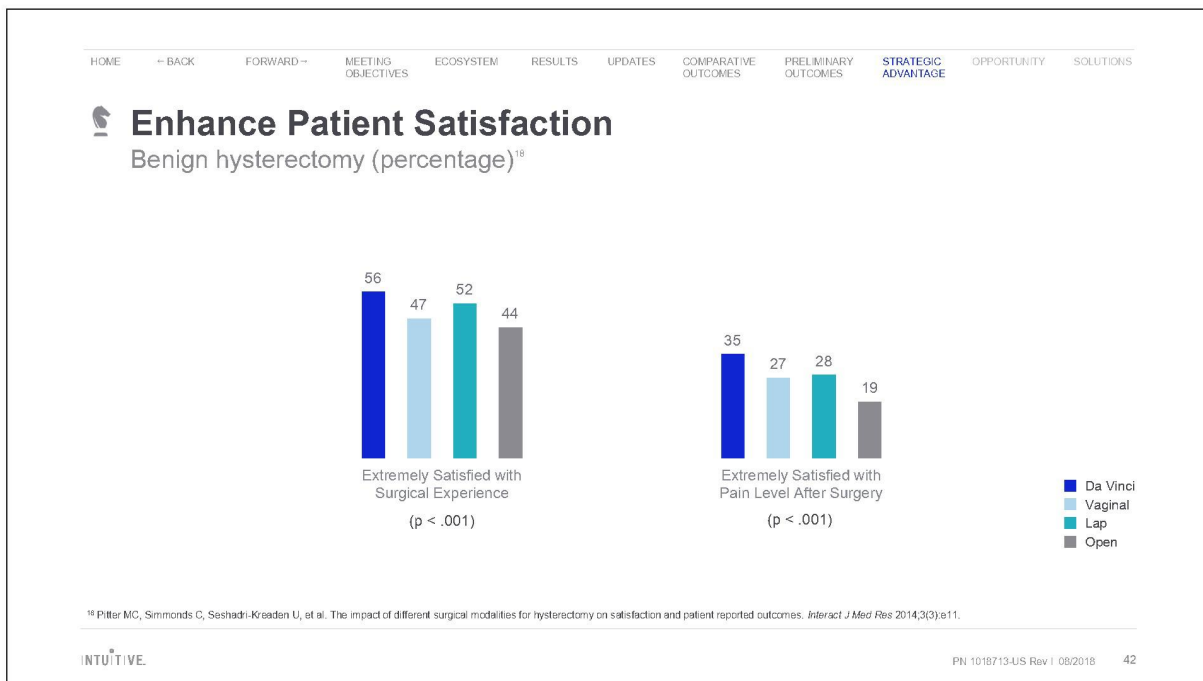
17. Internal analysis of Q1 2013 – Q3 2015 premier database.



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# Strategic Advantage

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Purpose of slide:

Show patients that elect to have da Vinci Surgery for benign hysterectomy have a higher degree of satisfaction compared to that of other surgical modalities.

Statements:

Would you agree that patient outcomes can influence patient satisfaction and experience?

In a published study, ~10,000 hysterectomy-benign patients were studied with respect to satisfaction with the surgical experience and pain levels.

The chart demonstrates that these patients that elected to have da Vinci benign hysterectomy reported the highest degree of satisfaction with the overall surgical experience and pain.

With value-based purchasing including a patient satisfaction component (via HCAHPS scores), a patient's experience can have a direct and measurable impact on hospital revenue.

Probes:

"Have you examined your patient satisfaction scores across surgical modalities?"

"What impact does patient satisfaction on surgical revenue for your hospital?"

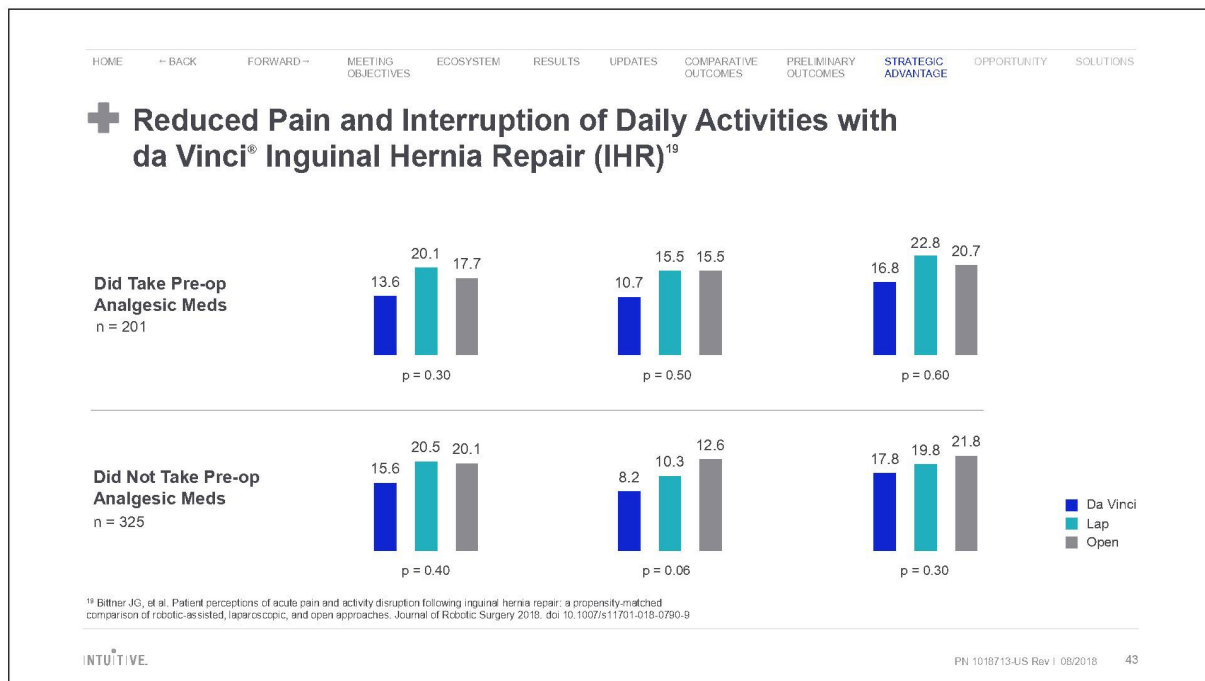
Objection Handling:

HCAHPS surgery does not have clinical measures, and this is what pay-for-performance is going to be based on, so not sure how this surgery is relevant?

That is true with respect to HCAHPS, as they are looking at hospital room cleanliness, professionalism of doctors, etc. However, would you agree that surgical clinical outcomes has a direct effect patient satisfaction level? If you were converted to open when you expected an MIS procedure would that influence the satisfaction scores?

Data Source:

18. Pitter MC, Simmonds C, Seshadri-Kreaden U, et al. The impact of different surgical modalities for hysterectomy on satisfaction and patient reported outcomes. *Interact J Med Res* 2014;3(3):e11.



Purpose of slide:

Present early, quantitative market research supporting patient perceptions around pain in da Vinci surgery vs laparoscopic and open surgery.

Statements:

A quantitative market research study recently conducted by Intuitive Surgical evaluated perceptions around pain among 406 patients who have had a inguinal hernia procedure within the past 12 months (robotic-assisted vs. lap vs. open)

Patient sample size: Open = 167, Lap = 168, da Vinci = 74

Methodology: online survey of past year IHR patients through a national market research panel and 14 individual physician offices

As you can see, the numbers shown here represent the perceived average pain score and degree that daily activities were disrupted of patients that took part in the market research:

da Vinci surgery patients have less pain than those that had an open and laparoscopic inguinal hernia repair

da Vinci surgery patients have the least disruption to daily activities

A higher percent of da Vinci surgery patients experience time to little or no pain within two weeks than those that had an open and laparoscopic inguinal hernia repair

65% da Vinci surgery vs 50% open surgery

A higher percent of da Vinci surgery patients experience time to no pain medication within two weeks than those that had an open and laparoscopic inguinal hernia repair

89% da Vinci surgery vs 74% open

Probe

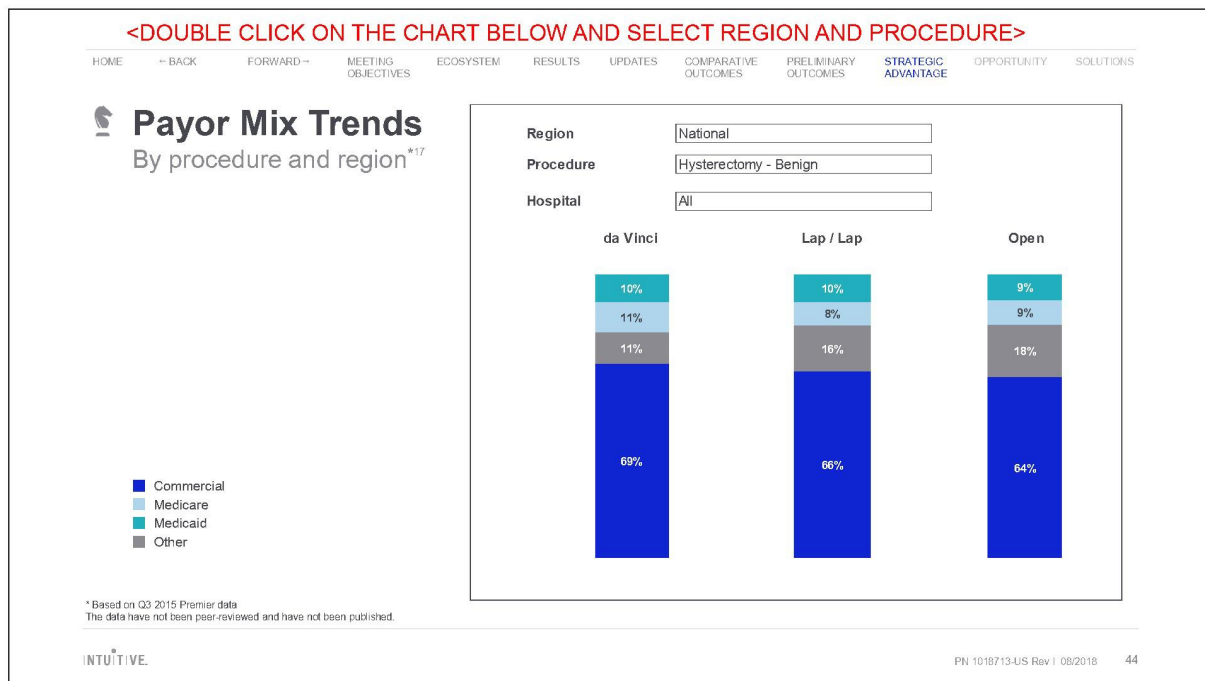
What's your perception around pain and daily activity disruption in patients receiving da Vinci surgery vs open and/or laparoscopic surgery?

How important is pain and return to daily activities to you and your patients?

What impact could patients' pain experience have on hospital patient satisfaction scores?

Data Source:

19. Results from an accepted abstract on patient pain perception, November 2016. N = 406 patients. This is a quantitative market research study and expresses opinions of patients that received open, laparoscopic or da Vinci inguinal hernia repair in the past year. This data comparison is not case matched for patient complexity and/or disease status and may not be comparable across these surgical modalities. The data have not been peer-reviewed and have not been published.



#### Purpose of slide:

Demonstrate the insurance mix of patients that elect to have specific procedures at a regional level – da Vinci surgery vs. open and lap.

#### Statements:

Throughout the country, hospitals are looking to diversify their payor mix in an effort to attract or retain more commercially/privately insured patients. Premier data shows that for the core procedures, da Vinci surgery attracts more commercially insured patients compared to laparoscopic and open surgery.

#### Probes:

What do you think the reasons are for patients with commercial insurance aligning more with da Vinci procedures? (potential answers – more educated/informed patient chooses da Vinci surgery.)

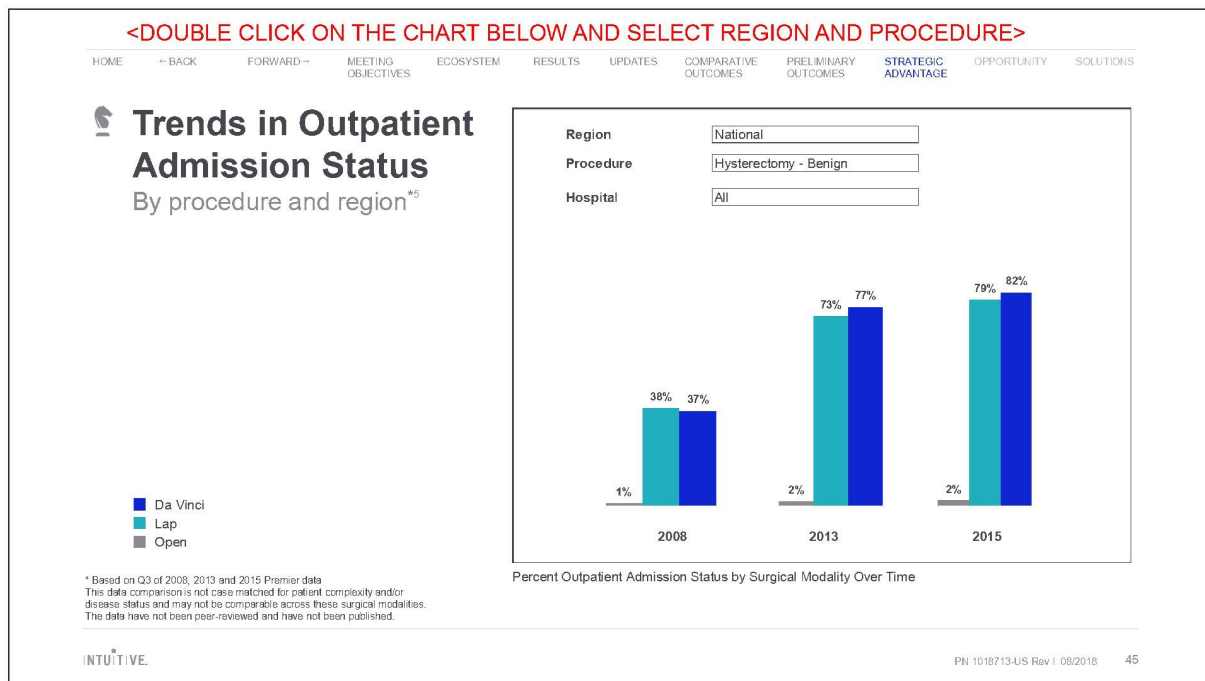
Have you looked at your specific payor mix vs. surgical approach; do any of these procedures stand out to you as a primary service line you want to attract?

On average, what is your % premium for commercial patients vs. Medicare / Medicaid?

In 2016, Medicare increased the average reimbursement rate for outpatient benign hysterectomy procedures by 86% and is for the first time reimbursed at a higher rate than an inpatient hysterectomy. Have you evaluated your reimbursement rate for outpatient procedures and if so, is it in line with the average Medicare reimbursement rate?

#### Source:

17. Internal analysis of Q1 2013 – Q3 2015 premier database.



#### Purpose of slide:

Demonstrate the prevalence of outpatient surgery in low-acuity procedures like benign hysterectomy, inguinal hernia and low complexity ventral hernia.

#### Statements:

“Outpatient” in this data is defined by admission status, not site of care. In other words, the percentages displayed in this chart represent the percent of patients that are “outpatient” and not admitted to the hospital by surgical modality.

The majority of patients having low-acuity procedures like benign hysterectomy, inguinal hernia and low complexity ventral hernia are receiving outpatient procedures rather than being admitted to the hospital.

80% of da Vinci benign hysterectomy 96% of da Vinci inguinal hernia, and 80% of ventral hernia cases are performed as outpatient procedures.

Given the increase in reimbursement for a number of these procedures, specifically benign hysterectomy, da Vinci surgery could represent an increase in your hospital's reimbursement.

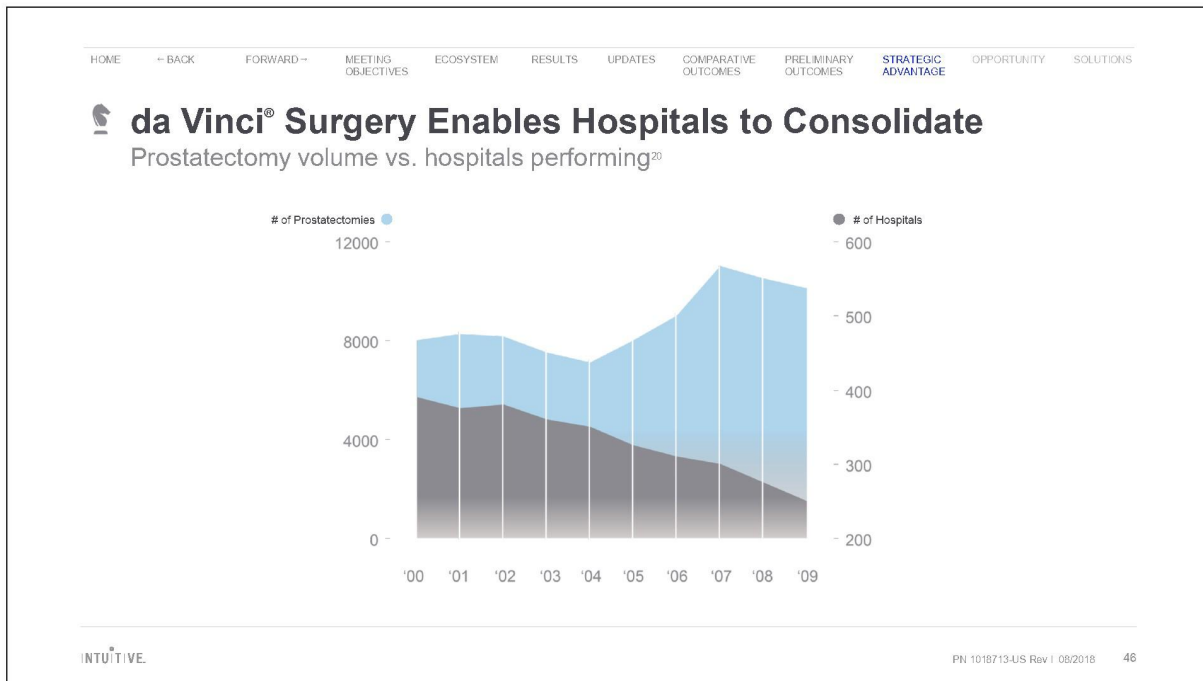
#### Probes:

What is your inpatient/outpatient mix for da Vinci benign hysterectomy, inguinal hernia and ventral hernia procedures?  
 Would you see value in moving some of these outpatient procedures to an alternate site of care, like your HOPD, to open access in the main OR for higher acuity procedures?

#### Source:

5. ISI internal estimates based on Q1 2008 through Q3 2015 national Premier database. Analysis and data, including ICD-9 codes, are on file at Intuitive Surgical. Data and conclusions should be considered preliminary unless published in a peer-reviewed journal. NOTE: procedure adoption numbers are snapshots of the third quarter of 2009, 2012 and 2015





#### Purpose of slide:

This slide provides peer reviewed publication support to support claims of patients seeking / traveling to receive da Vinci surgery; and eventual procedure consolidation.

#### Statements:

In 2012, Dr. Karyn Stitzenberg, a surgical oncologist from UNC-Chapel Hill did an analysis on the consolidation and travel patterns of patients seeking prostatectomy surgery.

Methods: A population-based observational study of all prostatectomies for cancer in New York, New Jersey, and Pennsylvania from 2000 to 2009 was performed using hospital discharge data. Hospital procedure volume was defined as the number of prostatectomies performed for cancer in a given year. Straight-line travel distance to the treating hospital was calculated for each case. Hospitals were contacted to determine the year of acquisition of the first robot.

Conclusion: the hospitals offering robotic surgery consolidated the patients over time, and those who didn't initiate a robotic surgery program eventually lost their service line.

#### Probes:

"Based on the trends that we just reviewed in both gynecology and general surgery, do you think the same consolidation process will happen with these surgical specialties?"

"What are your plans to address this consolidation?"

#### Objection handling:

This study was just about New York, Pennsylvania, and New Jersey....our market is different so can you draw this conclusion for the entire U.S.?

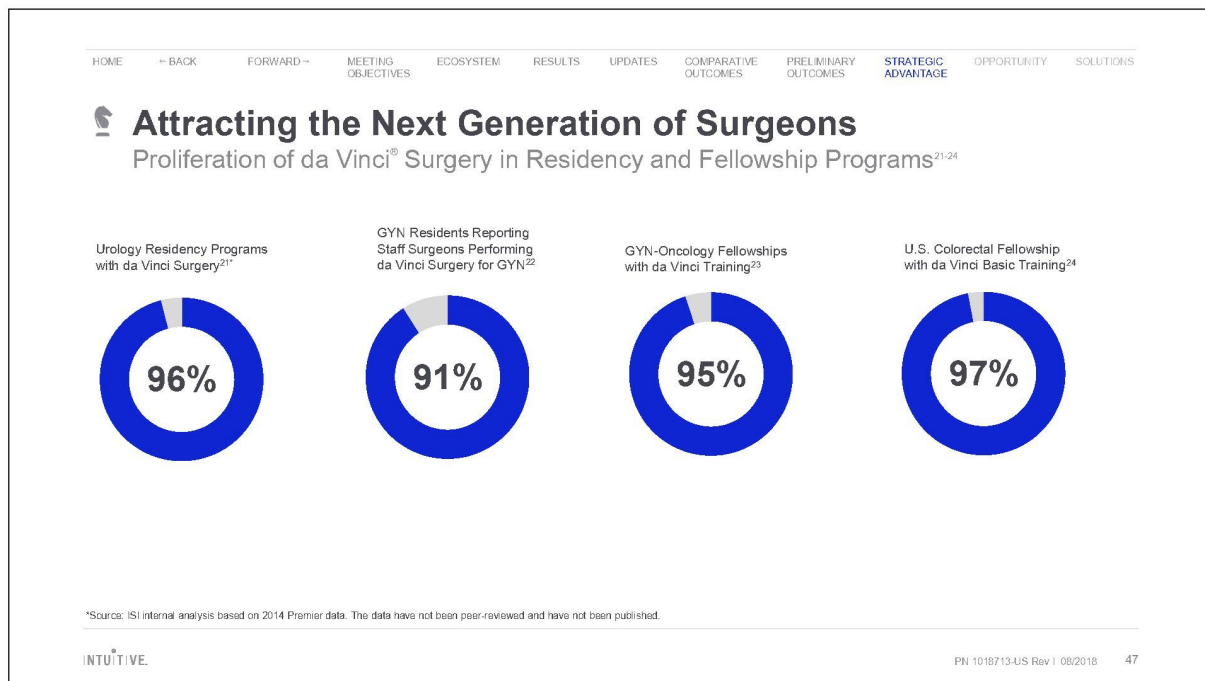
"You are correct, this study only focused on the northeast, however, we have seen the same trends throughout the U.S. With 90% or more of the prostatectomies in the US being treated with da Vinci surgery, do you think it is safe to say that if you are in the prostatectomy business, you likely have a da Vinci surgery program?"

Why did the number of prostatectomies fall-off in 2007?

"Prostatectomy procedures actually stayed relatively flat during 2007 and beyond, but we know that the hospitals that invested in da Vinci surgery were growing and consolidating patients. It is possible that IMRT may have had a small impact, and also possible that as a result of less hospitals doing prostate surgery, it could bring the overall number down."

#### Data Source:

20. Karyn B. Stitzenberg, et al. Trends in Radical Prostatectomy: Centralization, Robotics, and Access to Urologic Cancer Care. Cancer. 2012 Jan 1; 118(1): 54-62.



#### Purpose of slide:

This slide shows the proliferation of da Vinci surgery in urology, gynecology, and general surgery resident / fellowship programs, and implies growing surgeon interest in having access to a da Vinci Surgical System.

#### Statements:

Attracting physicians is among hospital CEOs' top imperatives. As hospitals evaluate da Vinci surgery and opportunities to attract surgeons, they should consider the proliferation of da Vinci surgery in residency and fellowship programs where physicians are being exposed to robotic-assisted surgery.

In the case of URO, 96% of hospitals with urology residency programs are performing da Vinci Surgery. As shown here, da Vinci surgery is being rapidly adopted by residencies and fellowships across specialties.

A successful da Vinci surgery program can help attract top talent.

#### Probes:

"Have you also seen an increased interest in robotics for surgeon's you are recruiting?"

"What specific specialties are you recruiting for today?"

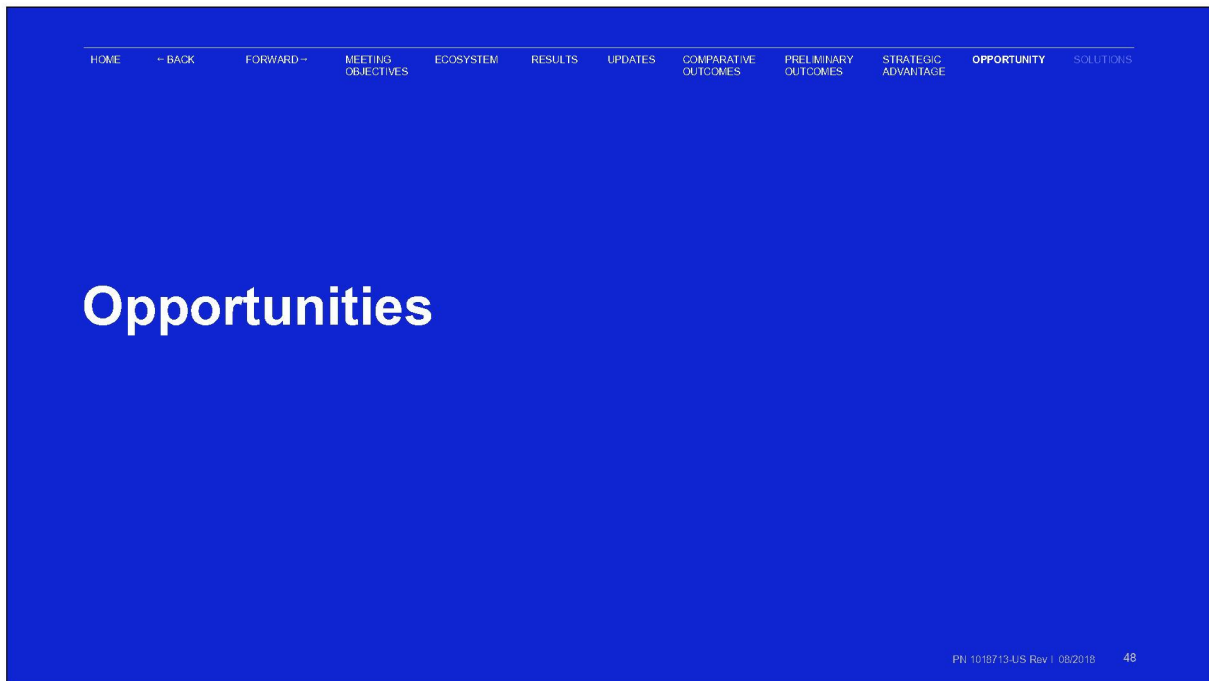
#### Data Source:

21. ISI internal estimates based on 2014 national Premier database. Analysis and data, including ICD-9 codes, are on file at Intuitive Surgical.

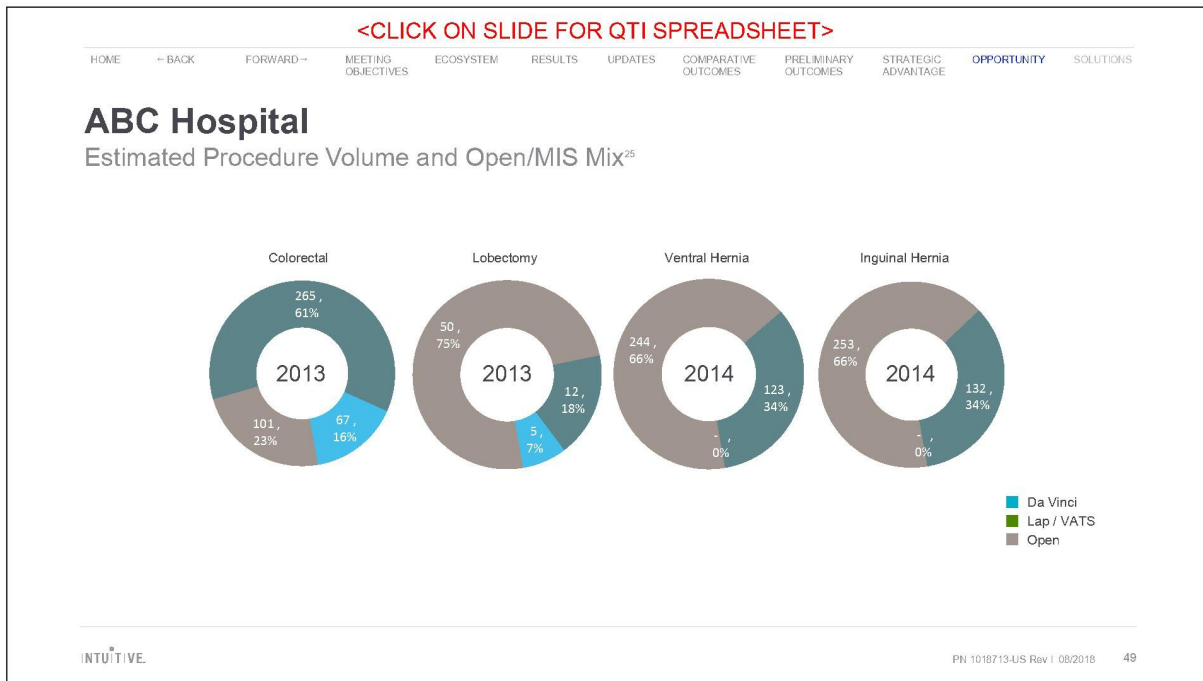
22. Smith, Aimee L., et al. J Robotic Surg (2010) 4:23-27; Survey of obstetrics and gynecology residents' training and opinions on robotic surgery

23. Soorena Fatehchehr, MD. Robotic Surgery Training in Gynecologic Fellowship Programs in the United States. Journal of the Society of Laparoendoscopic Surgeons. July-Sept 2014 Volume 18 Issue 3

24. Association of Programs Directors in Colon and Rectal Surgery (APDCRS)







Data Source:

25. Open and Lap/VATS estimates: IMS Health, 2013-2014 (the most current data available at the time of data purchase by procedure); procedure estimates may not include those from cash-pay patients. da Vinci® procedure volumes: Intuitive Surgical (data on file)

<DOUBLE CLICK ON THE CHART BELOW AND SELECT STATE & HOSPITAL NAME>

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## Hospital Comparison – Hospital Surgical Site Infections

Data.Medicare.gov (FY 2017)<sup>20</sup>

1. Select State

2. Select Hospital Name

Hospital	City	State	SSI Score	Penalty	Penalty Amount
COLUMBIA MEMORIAL HOSPITAL	HUDSON	NY	7		

**SSI (Surgical Site Infection) Score** rated on scale from 1 to 10. A lower score is better, a higher score is worse

- \* SSI measures impact specific to Colon Surgeries and Abdominal Hysterectomies

\* Denotes hospitals with a total hospital acquired condition score above the 75th percentile and may be subject to payment reduction in FY2017. The hospitals that are subject to a 1% payment reduction can be found on CMS.gov

Penalty amount estimated based on 1% of 2014 Medicare payment

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Purpose of slide:

Review hospital performance in surgical site infection scores based on publicly available information on the Hospital Compare website under Medicare.gov

Statements:

The Patient Protection and Affordable Care Act (ACA) established the Hospital-Acquired Condition (HAC) Reduction Program to provide an incentive for hospitals to reduce HACs.

Effective beginning on October 1, 2014, the HAC Reduction Program requires an adjustment to Medicare payments for hospitals that rank in the worst-performing quartile of all Medicare hospitals with respect to risk-adjusted HAC quality measures. These hospitals will have their payments reduced to 99 percent of what would otherwise have been paid for such discharges.

Among the measures under the HAC program are SSIs (surgical site infections) specific to colon surgery and abdominal hysterectomy

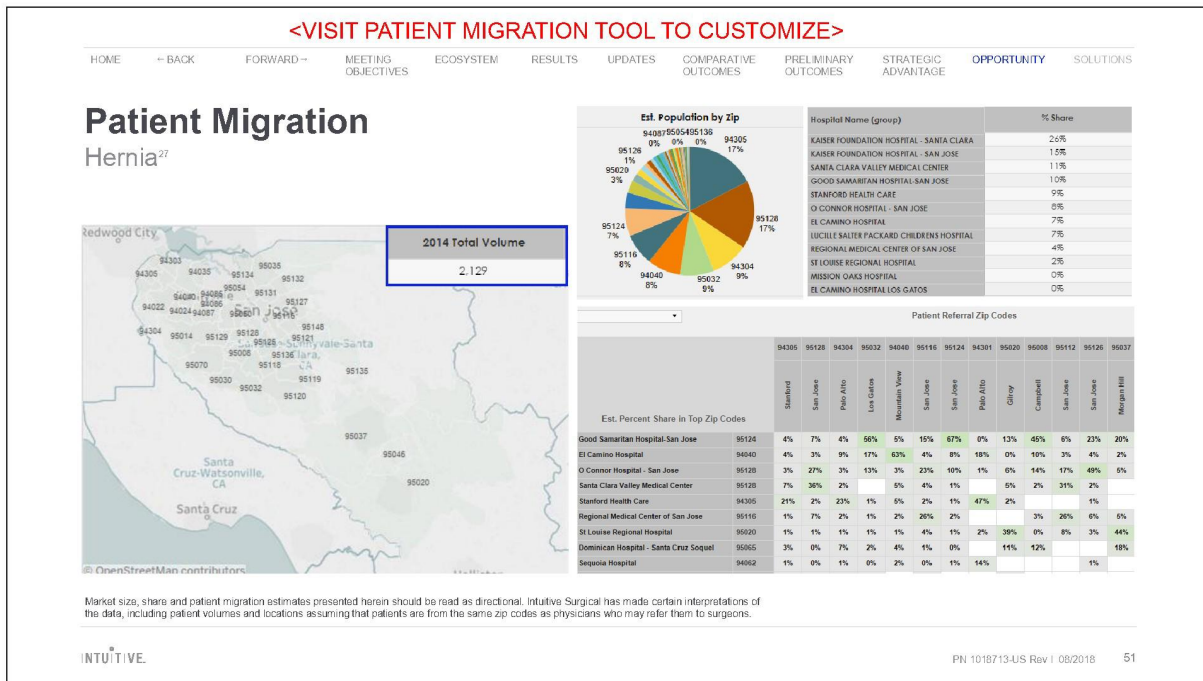
The data shown here represents your hospital's SSI score and whether your hospital is subject to a HAC penalty based on 2015 data. Each hospital is assigned a measure score between 1 and 10 for each SSI measure. Note: a lower score is better, a higher score is worse.

Probes:

For hospitals with high SSI scores (higher scores are worse), what role has da Vinci surgery played or can it play in reducing these hospital-acquired conditions?

What is the degree of open surgery in procedures like colon surgery at your hospital and what impact can that have on high SSIs?

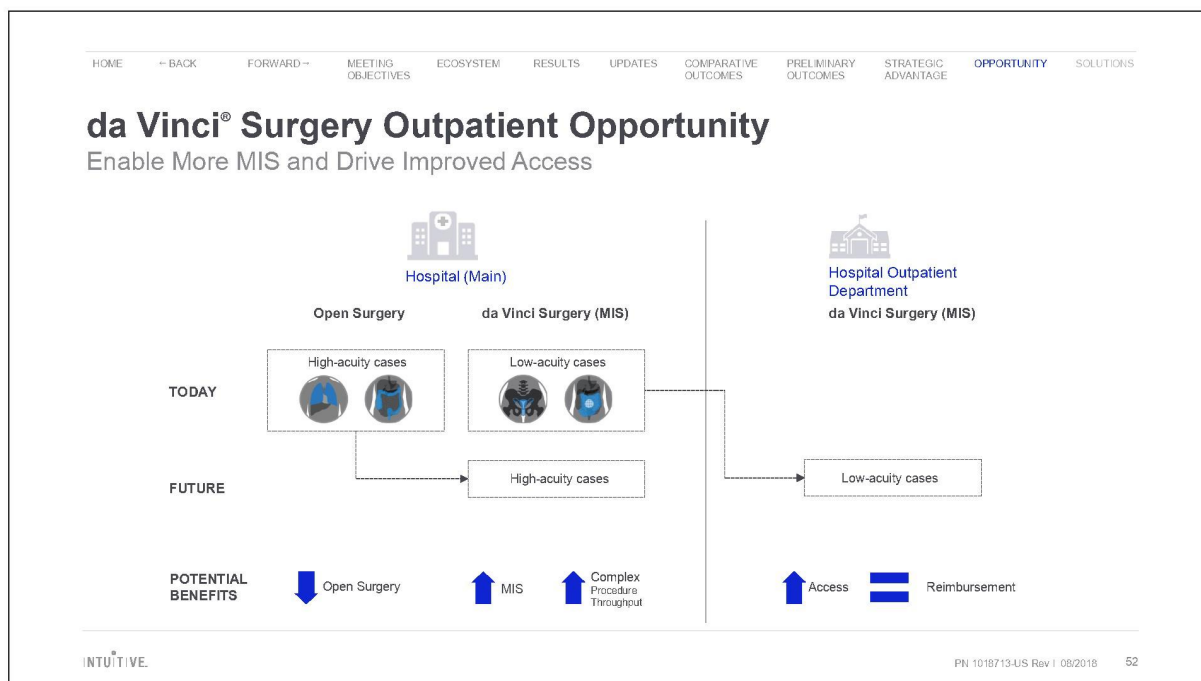
26. FY2017 CMS HAC penalty report, Data.Medicare.gov



Patient Migration Tool: [https://tableau.intusurg.com/#/views/PatientMigrationv3\\_5/Overview?iid=1](https://tableau.intusurg.com/#/views/PatientMigrationv3_5/Overview?iid=1)

Data Source:

27. IMS Health, 2014



### Purpose of slide:

Discuss the concept of enabling more MIS in high-acuity cases in the hospital OR while leveraging an HOPD asset to accommodate/grow low-acuity cases

### Statements:

Today, you have invested in da Vinci surgery for a range of clinical applications, spanning high-acuity procedures (such as colorectal and thoracic surgery) to lower-acuity procedures (such as hysterectomy and hernia repair). In light of the trends we discussed earlier, many hospitals are evaluating strategies to open up more access in the hospital OR to perform more MIS/da Vinci surgery by shifting their low-acuity cases to a hospital outpatient department. By shifting low-acuity cases to the HOPD, hospitals potentially benefit from the access, efficiencies and increased consistency of back-to-back cases without any change in reimbursement (be it a given procedure performed at the main hospital or HOPD). Consequently, access to da Vinci surgery for high-acuity procedures in the main hospital expands potentially allowing you to enable more MIS for procedures that may still be performed open. The benefit is increased access for MIS and potential reduction in open surgery and the associated costs to treat those patients.

### Probes:

"As you work toward creating synergies between your HOPD and inpatient setting, what types of plans, if any, do you have for maximizing the clinical and financial value that specific surgical procedures bring to each setting?"

"Is there a value to opening more surgical time in the main OR for high-acuity / more complex procedure volume?"

"What clinical value have you experienced with da Vinci surgery in moving open → MIS? What is preventing you from enabling more MIS for complex, high acuity procedures?"

"Do you feel as though your surgeons currently have a path for booking 3-4 robotic-assisted procedures back to back with minimal turnover? Could the HOPD be more efficient for them? Could this be a draw to attract surgeons from the competitive facility?"

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# Solutions

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## Challenges and Solutions

Opportunity	Challenges	Solutions
Clinical		
Operational		
Strategic		

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## Key Clinical References

	Benign Hysterectomy		Colon Resection	Rectal Resection		Lobectomy	Ventral Hernia	Incisional Hernia	Inguinal Hernia
Year	2015	2014	2016	2014	2015	2014	2017	2017	2016
Reference #	7	8	9	10	11	12	13	14	15
Publication	Luciano AA International Journal of Medicine	Martino, MA Journal of Minimally Invasive Gynecology	Benlice C International Journal of Medical Robotics and Computer Assisted Surgery	Speicher PJ Annals of Surgery	Midura EF Surgery	Adams RD Annals of Thoracic Surgery	Campo LA Surgical Endoscopy	Prabhu AS J Am Coll Surg	Kimberly E. Waite J Robotic Surg
Publication source	Review of 156 hospitals in Premier Research Database over 6 years	Retrospective study of 2,554 hysterectomy patients in health network database	Case-matched comparison from the ACS-NSQIP	National Cancer Database NCB		Multicenter study based on Society of Thoracic Surgeons Database. Robotic early experience in comparison to VATS and Open from STS	Multicenter retrospective study of 114 ventral hernia patients	Case-matched comparison from AHSQC database	Retrospective review of 63 consecutive patients at Oakland University William Beaumont School of Medicine
Limitations	Retrospective, non-matched  Analysis limited to hospitals with robotics	Retrospective, non-matched  Single institution	Retrospective	Several patient characteristics unavailable  Lack of specific complication data		Retrospective, non-matched  Early learning curve for robotics	Small sample	Retrospective  Mesh fixation differences	Single surgeon  Single institution  Retrospective, non-matched  Small sample

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## Cost Modeling Methodology

Ref.	Clinical Metric	Resource(s)	Calculation Method	Published Value	Value Adjustment
a	Operative Time	Chatterjee A, Payette MJ, Demas CP, et al. Opportunity cost: a systematic application to surgery. Surgery 2009;146:18-22.	Opportunity Cost	\$11/min	2009-2014 Medical Services Consumer Price Index
NOTE: Published value is based on laparoscopic ventral hernia repair.					
b	Conversions	Intuitive Surgical, Inc. analysis of 2013 Premier Database for robotic and laparoscopic conversion costs.	Weighted Average	n/a	2013-2014 Medical Services Consumer Price Index
NOTE: Analysis and data, including ICD-9 codes, are on file at Intuitive Surgical.					

**NOTE:**

- Surgical complications classified as Clavien-Dindo Grade I constitute "Minor Complications" for the purposes of this analysis. The DRG multiplier featured (0.3) is an average of the calculated values from column 4 for each of these classifications.
- Surgical complications classified as Clavien-Dindo Grade IIb, IVa and IVb constitute "Major Complications" for the purposes of this analysis. The DRG multiplier featured (2.8) is an average of the calculated values from column 4 for each of these classifications.

\*Based on 2014 Premier Database inpatient/outpatient procedure mix and DRG mix.

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## Cost Modeling Methodology (cont'd.)

Ref.	Clinical Metric	Resource(s)	Calculation Method	Published Value	Value Adjustment
c	Complications				
	DRG multiplier	Vonlanthen R, Slankamenac K, Breitenstein S, et al. The impact of complications on costs of major surgical procedures: a cost analysis of 1200 patients. <i>Ann Surg.</i> 2011;254(6):907-913.	$\frac{\text{Cost of complication} - \text{Cost of surgery w/o complications}}{\text{Cost of surgery w/o complications}}$	n/a	n/a
	DRG value	FY2018 Final Rule Tables. Center for Medicare and Medicaid Services.	Weighted Average*	<b>Hyst-Benign</b> DRG-742 (32%*) - \$8,527.10 / DRG-743 (9%*) - \$5,521.30 APC-5392 (59%*) - \$9,861.00 <b>Lobectomy</b> DRG-163 (18%*) - \$27,177.90 / DRG-164 (50%*) - \$14,031.28 DRG-165 (28%*) - \$9,861.00 <b>Colon Resection</b> DRG-329 (25%*) - \$27,177.90 / DRG-330 (47%*) - \$13,842.38 DRG-331 (41%*) - \$9,005.93 <b>Rectal Cancer</b> DRG-332 (12%*) - \$24,848.85 / DRG-333 (47%*) - \$13,256.36 DRG-334 (41%*) - \$9,018.50 <b>Ventral Hernia Repair</b> DRG-353 (3%*) - \$15,853.33 / DRG-354 (11%*) - \$9,106.78 DRG-355 (13%*) - \$8,785.38 / APC-0132 (73%*) - \$4,001.00 <b>Inguinal Hernia Repair</b> DRG-350 (3%*) - \$13,855.38 / DRG-351 (1%*) - \$7,707.73 DRG-352 (4%*) - \$5,346.93 / APC-0131 (82%*) - \$4,038.82	n/a

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## Cost Modeling Methodology (cont'd.)

Ref.	Clinical Metric	Resource(s)	Calculation Method	Published Value	Value Adjustment
d	Transfusions	Shandor A, Hofmann A, Ozawa S, et al. Activity-based costs of blood transfusions in surgical patients at four hospitals. <i>Transfusion</i> 2010;50(4):753-765.	$\$1,183.32 + \$726.05 / 2 = \$955$	\$1,183.32 / \$726.05	2008-2014 Medical Services Consumer Price Index
NOTE: Per-unit blood cost is based on the average of the two hospitals of the four studied that are based in the U.S., specifically, EHMC and RIH (the other two are in Europe).					
e	Surgical Site Infections	Zimlichman E, Henderson D, Tamir O. Health care-associated infections: a meta-analysis of costs and financial impact on the U.S. health care system. <i>JAMA Intern Med.</i> 2013 Dec 9-23;173(22):2039-46.	n/a	\$20,785	n/a
f	Readmissions	Agency for Healthcare Research and Quality. HCUPnet: A tool for identifying, tracking, and analyzing national hospital statistics. All patient readmissions within 30 days. National statistics, 2012. (index stay - 124 Hysterectomy, abdominal and vaginal) and (index stay - 44 Coronary artery bypass graft (CABG)).	n/a	\$11,087 (Hysterectomy, abdominal and vaginal)	2012-2014 Medical Services Consumer Price Index
g	Recurrences	Poulose BK, Shelton J, Phillips S, et al. Epidemiology and cost of ventral hernia repair: making the case for hernia research. <i>Hernia.</i> 2012 Apr;16(2):179-83.	n/a	\$15,899	n/a
h	Length of Stay	Haipem NA, Pastores SM. Critical care medicine in the United States 2000-2005: an analysis of bed numbers, occupancy rates, payer mix, and costs. <i>Crit Care Med</i> 2010;38(1):65-71.	n/a	\$1,153/day (general ward) \$3,518/day (intensive care)	2005-2014 Medical Services Consumer Price Index

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## References

In order to provide benefit and risk information, Intuitive Surgical reviews the highest available level of evidence on representative da Vinci procedures. Intuitive Surgical strives to provide a complete, fair and balanced view of the clinical literature. However, our materials should not be seen as a substitute for a comprehensive literature review for inclusion of all potential outcomes. We encourage patients and physicians to review the original publications and all available literature in order to make an informed decision. Clinical studies are available at [pubmed.gov](http://pubmed.gov).

1. Intuitive Surgical internal estimates based on Q1 of 2008 national Premier database. Analysis and data, including ICD-9 codes, are on file at Intuitive Surgical. Sources for market share estimates are based on data purchased for that year. Data and conclusions should be considered preliminary unless published in a peer-reviewed journal. NOTE: Ventral Hernia Repair market share numbers include only primary procedures.
2. Intuitive Surgical internal estimates based on Q1 of 2017 national Premier database for open, conventional MIS and da Vinci procedures
3. Intuitive Surgical internal estimates based on Q1 of 2017 national Premier database for open procedures
4. Intuitive Surgical internal estimates based on Q1 of 2017 JP Morgan analysis and data for da Vinci procedures
5. ISI internal estimates based on 2008 through 2017 national Premier database. Analysis and data, including ICD-9 codes, are on file at Intuitive

Surgical. Data and conclusions should be considered preliminary unless published in a peer-reviewed journal

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7. Luciano AA, Luciano DE, Gabbert J and Seshadri-Kreaden U. The impact of robotics on the mode of benign hysterectomy and clinical outcomes. *Int J Med Robot* 2015 March. doi: 10.1002/ircs.1645.
8. Martin A, Martino, MD. A Comparison of Quality Outcome Measures in Patients Having a Hysterectomy for Benign Disease: Robotic vs. Non-robotic Approaches. *Journal of Minimally Invasive Gynecology*, 2014
9. Benlice, C, Aytac, E., Costedio, M., Kessler, H., Abbas, M. A., Remzi, F. H., and Gorgun, E. (2016), Robotic, laparoscopic, and open colectomy: a case-matched comparison from the ACS-NSQIP. *Int J Med Robotics Comput Assist Surg*. doi: 10.1002/ircs.1783
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11. Midura EF, et al. The effect of surgical approach on short-term oncologic outcomes in rectal cancer surgery. *Surgery*. 2015 Aug;158(2):453-9. doi: 10.1016/j.surg.2015.02.020.
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15. Kimberly E. Wade. Comparison of robotic versus laparoscopic transabdominal preperitoneal (TAPP) inguinal hernia repair. J Robotic Surg DOI 10.1007/s11701-016-0560-1
16. Estimate generated using financial data provided by Parkview Medical Center, Pueblo, CO. This data presentation should be considered as informational only and is not conclusive. Based on a single institution and may not be reproducible or generalizable.
17. Internal analysis of Q1 2013 – Q3 2015 premier database.
18. Pitter MC, Simmonds C, Seshadri-Kreadon J, et al. The impact of different surgical modalities for hysterectomy on satisfaction and patient reported outcomes. Interact J Med Res 2014;3(3):e11.
19. Bittner JC, et al. Patient perceptions of acute pain and activity disruption following inguinal hernia repair: a propensity-matched comparison of robotic-assisted laparoscopic, and open approaches. Journal of Robotic Surgery 2016, doi 10.1007/s11701-016-0790-6
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23. Soerena Fatehchehr, MD. Robotic Surgery Training in Gynecologic Fellowship Programs in the United States. Journal of the Society of Laparoendoscopic Surgeons. July–Sept 2014 Volume 18 Issue 3
24. Association of Programs Directors in Colon and Rectal Surgery (APDCRS)
25. Open and Lap/VATS estimates: IMS Health, 2013-2014 (the most current data available at the time of data purchase by procedure); procedure estimates may not include those from cash-pay patients, da Vinci® procedure volumes: Intuitive Surgical (data on file)
26. FY2017 CMS HAC penalty report, Data.Medicare.gov
27. IMS Health, 2014

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## Literature Selection Methodology

### General study selection methodology

1. Peer reviewed publication
2. Review of large database or meta-analysis
3. Three-arm comparison between open, laparoscopic and robotic-assisted
4. Highlights key outcomes measures including length of stay, conversions, complications and readmissions

### Exceptions to the general study selection methodology include

#### Benign hysterectomy

Landeem study utilized for LOS; Luciano study reported inpatient procedures only  
Martino study utilized for readmissions; Luciano study doesn't report readmissions

#### Rectal resection

Speicher study utilized for conversions; Midura study doesn't report conversions  
Midura study utilized for readmissions and LOS; Speicher study doesn't report readmissions or LOS

#### Hernia repair

Incisional: Prabhu study utilized for LOS, complications and readmissions; study does not include conversions, OR time, SSI  
Inguinal: Waite study utilized in absence of large, peer-reviewed publications and review of large database studies

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## Procedure Code List

Used for Intuitive Surgical internal analysis of Premier Perspective Database

ICD9 procedure codes used to define:

LAR	Ventral Hernia	Inguinal Hernia	Hysterectomy Benign	Hysterectomy Malignant
48.62	53.41	17.11   53.04	68.31	68.31   180   183.5
48.63	53.42	17.12   53.05	68.39	68.39   180.1   183.8
154	53.43	17.13   53.1	68.41	68.41   180.8   198.6
154.1	53.49	17.21   53.11	68.49	68.49   180.9   198.82
154.2	53.51	17.22   53.12	68.51	68.51   181   233.2
154.3	53.59	17.23   53.13	68.59	68.59   182   233.3
154.8	53.61	17.24   53.14	68.9	68.9   182.1   233.30
196.2	53.62	53   53.15		68.61   182.8   233.31
197.5	53.63	53.01   53.16		68.69   183   233.32
	53.69	53.02   53.17		68.71   183.2   233.39
		53.03		68.79   183.3   795.06
				179   183.4
Prostatectomy	Sigmoidectomy	Right Colectomy (Cancer & Benign)	Lobectomy	
60.21	17.36	17.33	32.41	
60.29	45.76	45.73	32.49	
60.3	562.10	153.0		
60.4	562.11	153.4		
60.5	562.12	153.6		
60.69	562.13			

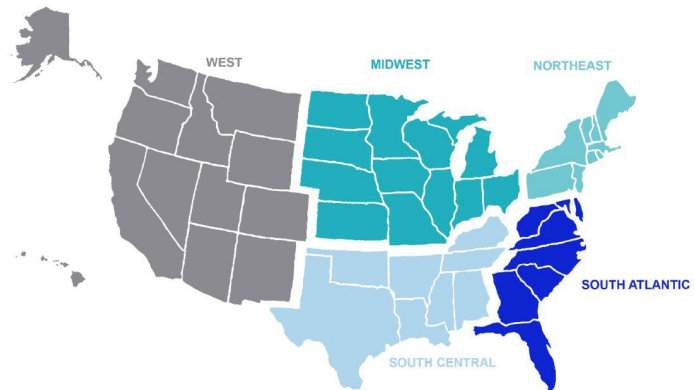
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## Provider Census Regions

Used for Intuitive Surgical internal analysis of Premier Perspective Database



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## Additional Clinical Outcome and I&A Slides

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## Optimize Instruments and Accessories Cost

### Ventral Hernia Repair

Instrument	da Vinci® (5 mm inst.)	Laparoscopic (1.5 tackers)	Open
<b>Total (excluding mesh cost)</b>	<b>\$1,107</b>	<b>\$1,800</b>	<b>\$1,185</b>
Tacker	—	\$1,050	\$700
Pain Pump	—	—	\$365
Drapes	\$200	—	—
Trocars (x 3 or 4)	\$80	\$150	—
Harmonic	—	\$480	—
Monopolar or Lap Tray	—	\$120	\$120
5 mm Monopolar	\$227	—	—
5 mm Bowel Grasper	\$200	—	—
5 mm Needle Driver (2)	\$400	—	—

Data and conclusions presented should be considered preliminary unless published in a peer-reviewed journal. This data presentation should be considered as informational only and is not conclusive. Financial data provided by Wilkes-Barre General Hospital, Wilkes-Barre, PA. The data presented here reflect a single institution experience. The results may or may not be reproducible and are not generalizable.


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#### Purpose of slide:

Use this slide to correct the misperception that da Vinci I&A costs are far higher than typical laparoscopic supply costs.

#### Statements:

There is often a misperception that da Vinci Surgery supply costs are significantly more expensive than those of laparoscopy. When we consider the reusable nature of da Vinci instruments (relative to disposable lap instruments) along with common instrument and accessories for both modalities, we find that the cost of da Vinci supplies is relatively in line or less than those of lap and open.

In this example, you will find that the elimination of certain instruments such as tackers in robotic ventral hernia repairs can have significant cost reduction implications.

#### Probes:

Did you know that the instrument and accessory costs for da Vinci for ventral hernia repair are more or less in-line with open and less than laparoscopic instrument and accessory costs?

Whatever the differences in supplies costs, in the scenario in which da Vinci surgery represents an increase in supply cost, it is important to evaluate value comprehensively vs. outcomes...do you agree?

Does da Vinci surgery offer a potential strategic revenue advantage; for example, a better payer mix?

#### Data Source:

Financial data provided by Wilkes-Barre General Hospital, Wilkes-Barre, PA. Data and conclusions presented should be considered preliminary unless published in a peer-reviewed journal. This data presentation should be considered as informational only and is not conclusive.

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## Optimize Instruments and Accessories Cost

Devin Garza, MD and Intuitive Internal Estimates

### Benign Hysterectomy

Instrument	da Vinci Multi-Port*	da Vinci Single-Site®*	Laparoscopic Multi-Port*	Open**
<b>Total</b>	<b>\$1,140</b>	<b>\$1,095</b>	<b>\$750-\$1,308*</b>	<b>\$234</b>
Bipolar / Ligasure	\$270	\$257	\$490	\$225
Monopolar / Scissors	\$340	\$143	—	—
Monopolar Tip Cover	\$20	—	—	—
Needle Driver / Endo Stitch™	—	\$230	\$398	—
Endo Stitch – 2 reloads	—	—	\$160	—
Large / Mega SutureCut™	\$240	—	—	—
Suction Irrigator	—	\$50	\$50	\$5
Drapes and Seals	\$200	\$272	—	—
Trocars / Port	\$70	\$143	\$210	—
Bovie Electrocautery	—	—	—	\$2
Suture	—	—	—	\$2

\* Financial data provided by St. David's North Austin Medical Center, Austin, TX. This data presentation should be considered as informational only and is not conclusive. Based on a single institution and may not be reproducible or generalizable.

\*\* Range with and without Endo Stitch™ and reloads

\* Estimate generated by Intuitive Surgical, Inc.

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## Optimize Instruments and Accessories Cost

Reza Gamagami, MD and ISI Internal Estimates

Instrument	da Vinci®	Laparoscopic	Open
<b>Total</b>	<b>\$2,410</b>	<b>\$2,235</b>	<b>\$1,698</b>
Cadiere Forceps	\$210	—	—
Vessel Sealer	\$595	\$485	\$655
Stapler (+ 2 reloads)	\$680	\$550	\$510
Large Suturecut Needle Driver	\$220	—	—
Permanent Cautery Hook	\$200	—	—
Small Graptor	\$240	—	—
Bovie Pencil	—	—	\$8
EEA	—	\$500	—
Hand Assist GelPort	—	\$500	\$425
Trocar and Drapes	\$265	—	—
Lap Graspers & Scissors	—	\$200	—
Extraction Bags	—	—	\$100

\* Estimate generated using financial data provided by Silver Cross Hospital, Joliet, IL and Oklahoma Surgical Hospital, Tulsa, OK. This data presentation should be considered as informational only and is not conclusive. Based on a single institution and may not be reproducible or generalizable.

+ Open estimate based on internal estimates.

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## Optimize Instruments and Accessories Cost

Craig Johnson, MD; Darry Meyer, MD; Gregory DeArmond, MD; Alan Bassin, MD

### Rectal Resection

Instrument	da Vinci®	Laparoscopic™	Open™
<b>Total</b>	<b>\$2,355</b>	<b>\$1,665</b>	<b>\$1,615</b>
Vessel Sealer	\$595	\$480	\$485
Stapler (+ 2 reloads)	\$680	\$465	\$550
EEA	—	\$500	\$500
Monopolar Curved Scissors	\$320	—	—
Needle Driver	\$220	—	—
Grasper	\$200	—	—
Trocars (x4)	—	\$140	—
Disposable Accessory Kit	\$260	—	—
Wound Protector	\$80	\$80	\$80

\* Estimate generated using financial data provided by Woodland Heights Medical Center, Lufkin, TX and Oklahoma Surgical Hospital, Tulsa, OK. This data presentation should be considered as informational only and is not conclusive. Based on a single institution and may not be reproducible or generalizable.

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## Optimize Instruments and Accessories Cost

Kimble Jett, MD

**Lobectomy**

Instrument	da Vinci <sup>®</sup>	Laparoscopic <sup>+</sup>	Open <sup>+</sup>
<b>Total</b>	<b>\$1,012</b>	<b>\$150</b>	<b>\$150</b>
Curved Bipolar Dissector	\$270	—	—
Cardiere Forceps	\$200	—	—
Thoracic Grasper	\$240	\$60	\$60
Small Clip Applier	\$42	—	—
Dennis Dissector	—	\$7	\$7
Node Grasper	—	\$7	\$7
Debakey Forceps	—	\$10	\$10
Thoracotomy Drape	—	\$66	\$66
Drape Kit – 4 Arm	\$260	—	—

\* Estimate generated using financial data provided by Frisco Medical Center, Frisco, TX. This data presentation should be considered as informational only and is not conclusive. Based on a single institution and may not be reproducible or generalizable.

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## Important Safety Information

Patients should talk to their doctor to decide if da Vinci Surgery is right for them. Patients and doctors should review all available information on non-surgical and surgical options and associated risks in order to make an informed decision.

Serious complications may occur in any surgery, including da Vinci® Surgery, up to and including death. Serious risks include, but are not limited to, injury to tissues and organs and conversion to other surgical techniques which could result in a longer operative time and/or increased complications. For Important Safety Information, including surgical risks, indications, and considerations and contraindications for use, please also refer to [www.davincisurgery.com/safety](http://www.davincisurgery.com/safety) and [www.intuitivesurgical.com/safety](http://www.intuitivesurgical.com/safety).

Individual surgical results may vary.

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